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CHAPTER I

APPOINTMENT OF THE COMMITTEE

Terms of Reference—Visits and Discussions

1. The Government of India have been considering ways and means of restoring Inland Water Transport to its rightful place since Independence, and the Ministry of Transport convened an inter-State conference of the States in North East India shortly thereafter. The object of this conference was to devise and consider suitable measures to establish Inland Water Transport on a firm and economic footing in the region. In 1949 they collected from the State Governments information on various points connected with development of inland water-borne traffic, construction of craft, training of marine personnel, registered Companies operating inland water transport, and so on.

1.1. A Conference of the States of North East India was again convened in April 1951, which resulted in the formation of the Ganga Brahmaputra Water Transport Board in 1952. Nevertheless, a real start was not made on an All India basis until the Study Group on Transport Planning set up in 1953, recommended that Inland Water Transport should be recognised and allotted its proper place in the Second Five Year Plan, and in all future Plans. This recommendation was accepted, and an allocation of Rs. 3 crores was made in the Second Five Year Plan for the development of Inland Water Transport.

1.2. Further in 1956, the Central Board of Transport recommended that the policy to be adopted in future should allow for the integration of Inland Water Transport in the national transport system of the country, and suggested that an enquiry on an "All-India" basis should be undertaken with a view to examining the part played by Inland Water Transport, and to make recommendations for its future development. Accordingly, this Committee was set up under the Ministry of Transport (Transport Wing) Resolution No. 3-IWT(44)/56 dated 18th February, 1957. The appointment of the Committee was warmly welcomed by the Estimates Committee of the Lok Sabha in their Sixty-first Report of March 1957 on Inland Water Transport.

1.3. The Composition of the Committee was as follows:—

1. Shri B. K. Gokhale, I.C.S. (Retd.), Chairman, Tungabhadra Board.
2. Shri H. P. Mathrani, I.S.E. (Retd.), Development Adviser & Joint Secretary, Ministry of Transport and Communications.
3. Shri U. N. Mahida, I.S.E., Chief Engineer, Government of Bombay. (Now Chairman, Bombay State Electricity Board).

4. Shri D. V. Joglekar, Director, Central Water & Power Research Station. (Now Adviser, Central Board of Irrigation & Power).
5. Member Planning, or Director, W.I.N., as alternate, Central Water & Power Commission. (Shri D. Mehta, I.S.E., Chief Engineer upto 4th June, 1958).
(Dr. K. L. Rao, Member from 5th June, 1958 to 15th September 1958).
(Shri Yadava Mohan, I.S.E., Member from 16th September, 1958).
6. Shri S. K. Mukerji, Chief Commercial Superintendent, Northern Railway.
7. Shri J. B. Craig, Managing Director, Macneil & Barry Ltd.
8. Shri B. L. Jalan, Representing the Federation of Indian Chamber of Commerce and Industry.
9. Shri K. C. Chatterjee, Managing Director, Indian Shipping Co., Ltd.

1.4. Shri S. P. Sarathy, an officer of the Calcutta Port Commissioners, was appointed as part time Secretary with effect from 15th May, 1957, *vide* Notification No. 9-IWT(44)/57 dated 10th July, 1957. The services of Shri H. D. Mohindra, Section Officer, (IWT) Ministry of Transport & Communications, were also placed at the disposal of the Committee as part time Assistant Secretary.

1.5. The terms of reference of the Committee were as follows:—

- (1) To review the part played by Inland Water Transport in the transport system of the country.
- (2) To advise on measures for the increased utilisation of Inland Water Transport including movement of bulk commodities to ports for purposes of export and movement of bulk commodities from the ports to the interior account being taken of what is already contemplated under the Second Five Year Plan for the development of Inland Water Transport, and to give an estimate of—
 - (a) the time needed for the execution of the schemes recommended, and
 - (b) their cost.
- (3) To examine the prospects of increasing and extending the river and canal services, including a direct service on the East Coast as well as from some point in the North to the South and to suggest steps to be taken to achieve effective co-ordination between the railways and inland waterways including financial participation, appropriate allocation of traffic as between the two modes of transport and arrangements for through booking.

- (4) To consider the organisation of an efficient country boat service on a co-operative basis with an appreciable increase in the present number with a view to facilitating the carriage of more goods and the question of mechanising at least some of the boats, with particular reference to cost, time and other implications.
- (5) To suggest whether any special organisation is necessary to execute the schemes and how they should be financed.

Another term of refence was subsequently added by Notification No. 3-IWT(44)/56, dated 4th April, 1957, as follows:—

To make recommendations regarding important waterways to be declared as "National Waterways" as envisaged in the Constitution.

Visits and Discussions:

2. We commenced our deliberations with a meeting at Poona from 3rd to 5th June, 1957, when we considered the scope of our terms of reference, the Report of the Estimates Committee of the Lok Sabha on Inland Water Transport and the outlines of the Master Plan drawn up by the Central Water & Power Commission. We also chalked out a procedure for eliciting information from the State Governments concerned and Trade and Boating interests. We visited the hydraulic models of a number of waterways and Ports of India and the navigation tank for testing models of various types of small craft including inland vessels at the Central Water & Power Research Station, Poona. We requested the Central Water & Power Commission to bring the large scale relief Map in the office of the Commission at New Delhi upto date with current thought and planning.

2.1. We visited:

- (a) In August 1957 and again in January 1958 the waterways of Madras and Andhra, between Vijayawada and Nagapatnam, particularly the Buckingham and Vedaranyam Canals.
- (b) In January 1958, the waterways of Orissa State including the High Level Canal Range I, the Kendrapara and Talanda Canals and the Mahanadi river in stretches between Hirakud Dam and the estuary including the proposed site for the Paradip Port.
- (c) In February, 1958, the coastal belt of Mysore and Kerala States in stretches between Malpe, north of Mangalore and Cape Comorin, including the important waterways, minor and major ports.
- (d) In September and October 1958, the Damodar Valley Corporation Navigation Canal from its headworks at Durgapur to its outfall into the Hooghly and the stretches of the river Ganga in the States of Bihar and Uttar Pradesh.

- (e) In December 1958 and February 1959, the waterways of North East India viz., tail reach of the Hijli Tidal Canal, the mouth of the Rupnarayan river, the Sunderban steamer route and the Chitpur and Circular Canals forming the inner boat route in West Bengal, the Cachar region along the Kushiya river from Karimgunj to Silchar and the stretch of the Brahmaputra from Tejpur to Dhubri including the Noonkhowa Shoal in Assam.
- (f) In April 1959, the coastal strip of Bombay State between Ratnagiri on the Konkan Coast and Broach and Surat near the mouths of the Narbada and the Tapi rivers.

2.2. While at the principal towns of each of the above States, we sought the advice of the Hon'ble Ministers and held meetings and discussions with officials and non-officials, representatives of Chambers of Commerce, Inland Water Transport Operators, Oil Companies, Port officials, representatives of regional Railways, boating organisations trade unions and other interests.

2.3. We first met in Delhi in September, 1957, when we studied on the large scale relief map the proposals outlined in the Master Plan, followed by discussions with the Chairman of the Central Water and Power Commission.

2.4. We also met the Chairman, Bihar I.W.T. Committee, Member, (Commercial) Railway Board; Adviser, Planning Commission; Secretary, Ministry of Transport and Communications and Managing Director, State Trading Corporation.

2.5. Our Chairman also discussed with the Hon'ble Ministers for Transport and Communications and Irrigation and Power the general problems of the waterways of the country and the lines on which the Committee intended to carry on its work.

2.6. We next met in Delhi in April 1958 when we had the benefit of views of Shri Balwantray G. Mehta, Chairman of the Estimates Committee of Parliament and other Members of the Estimates Committee who kindly met us.

2.7. We sought the advice of the Hon'ble Minister for Transport and Communications and Shri K. C. Neogy, Member, Planning Commission.

2.8. We discussed with the Chairman of the Central Water and Power Commission regarding investigations to be carried out on a number of waterways to assess their potentialities; the Secretary and officers of the Ganga Brahmaputra Water Transport Board regarding progress of projects included in the Second Five Year Plan; the Consulting Engineer (Roads), and the Managing Director, State Trading Corporation regarding facilities for transport of ores from Sukinda Mines through the Paradip Port in Orissa; and the Chief Inspector of Explosives regarding licensing of wooden barges for transport of bulk oil through the backwaters of Kerala.

2.9. We finally met in New Delhi from the 18th to 23rd May, 1959, to consider and finalise this Report.

CHAPTER II

Interim Recommendations

3. Inland Water Transport in other countries in relation to the overall planning of transport, industry, trade and commerce, has not only regained but already surpassed the importance it held in earlier days, and movement by this mode of transport is now accepted throughout the world, where adequate facilities exist, as the cheapest form of transport, particularly in respect of commodities in bulk.

3.1. In our country, interest in inland water transport has progressively increased in recent years and many reports have been prepared and submitted to the Government, but unfortunately with little result. In fact, it is true to say that in the majority of areas where waterways and canals have been in existence over the years, there is almost a complete lack of maintenance, and there has been no development of any kind.

3.2. Quite apart from the lack of proper appreciation of the possibilities that inland water transport offers under-developed countries, the lack of progress in inland water transport in India is mostly due to the un-coordinated growth of other forms of transport in relation to the consolidation and expansion of agriculture, trade, commerce and industry. Another relevant factor is the absence of a central organisation to deal with such matters, as is more fully explained later in this report.

3.3. During our earlier discussions with the State Governments, it became clear that the data available covering the movement of traffic, and also in regard to craft, etc., plying in each State, was totally inadequate and it was obvious that this also applied to other forms of transport. We, therefore, felt that it was essential to have traffic and engineering surveys carried out in order to provide the necessary data on which to base our report.

3.4. As the State Governments of Madras and Andhra had not been able to secure suitable officers to conduct a traffic survey of the Buckingham and Vedaranyam Canals, we obtained through the assistance of Shri S. R. Kalyanraman, Additional Member Commercial, Railway Board, the services of Shri T. K. Sundarajan, a retired District Commercial Officer of the ex-South Indian Railway for carrying out a traffic survey of the Buckingham and Vedaranyam Canals. Shri Sundarajan has carried out an extensive survey of the area and has just submitted his report. Copies of the report have been forwarded to the Governments of Madras and Andhra and the Central Government for necessary action.

3.5. At the instance of the Committee, the Government of Orissa agreed to have a traffic survey undertaken of their waterways. Shri A. S. Rajagopalan, a retired Assistant Commercial Superintendent of the South Eastern Railway had been engaged by the State Government. A copy of Shri Rajagopalan's report has recently been received from the State Government.

3.6. The Governments of Kerala and Mysore agreed to have a joint traffic survey undertaken of the coastal strip of the two States. Shri N. V. Vaidanatha Ayyar, retired Deputy Chief Commercial Superintendent, Southern Railway, was engaged for this purpose. Shri Ayyar unfortunately died soon after the commencement of the work and the traffic survey came to a standstill. The State Governments have now engaged Shri T. K. Sundararajan for this purpose and the traffic survey is in progress.

3.7. During our discussions with Shri R. K. Mitra, I.C.S., Chairman, Bihar I.W.T., Services Enquiry Committee, we had suggested that a traffic survey for the whole of North East India, especially Bihar, be conducted so that the results might be available to both the Committees before the end of 1958. Considerable difficulties were, however, experienced in obtaining the services of a suitable officer and as a result, the traffic survey could not be commenced till very recently, when it was entrusted to the National Council of Applied Economic Research.

3.8. The Government of Assam who have a railway officer on deputation to advise them on transport problems in general, had been requested by us to have a traffic survey of the Assam Region carried out under his guidance, particularly with regard to country boat traffic. The Assam Government have not been able to have a comprehensive traffic survey undertaken but have furnished a note on country boat traffic within the State. The Joint Steamer Companies and the Railways have also furnished us with valuable data.

3.9. As a result of the examination of the data made available upto April 1958, we decided that interim recommendations should be submitted covering improvements to waterways in the country which in our opinion, required immediate attention. This was considered essential in order that the meagre provision made in the Second Five Year Plan for inland water transport might not lapse owing to the delay in submission of our final report. We also felt that, in order to facilitate further functioning of the Committee, our difficulties should be placed before the Government for their consideration. With these objects in view, we submitted, in May 1958, five specific recommendations for the urgent consideration of the Government. These recommendations were contained in formal letters from the Secretary of the Committee to the Ministry of Transport and Communications and are to be found at Appendix 1. The main gist of these letters is reproduced below:—

Letter No. IWT-EC-4(2)/57/2 dated 12th May, 1958:

In this letter we suggested that immediate improvements to the existing inland waterways in North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras be undertaken at a cost of Rs. 270 lakhs as follows:—

North East India:

“Immediate steps should be taken to carry out the developments schemes already proposed during the Second Five Year Plan. The construction of an inland port at Pandu as well as arrangements for river conservancy and river training should be given the highest priority.”

(Proposed allotment—Rs. 142 lakhs).

Orissa:

"The Taldanda and Kendrapara Canals should be given priority in development. Increase in the minimum bed-width and depth of the High Level Canal Range I and the Kendrapara Canal and lining of the canals, provision of a minimum head-room of 16' under the bridges and construction of new locks to the dimension of 250'×30' were recommended. Provision of a dredger to keep the channel upstream of the anicut clear during the low water season was also recommended."

(Proposed allotment—Rs. 30 lakhs).

Kerala:

"The Canal between Quilon and Cochin should be improved to a minimum bed-width of 50' and an effective depth of 6' at normal low water. Two locks should be constructed between Punani and Chetwai to hold up fresh water. Locks should be designed to a dimension of 150'×20'×6' to meet reasonable future requirements. The West Coast Canal should be extended north of Badagara upto Mahe to a bed-width of 30' with an effective depth of 5' at low water level."

(Proposed allotment—Rs. 43 lakhs).

Mysore:

"A coastal canal between Mangalore and Malpe will form a useful connecting link between the ports of Mangalore and Malpe in the absence of rail communication."

(Proposed allotment—Rs. 10 lakhs).

Madras:

"Experimental dredging upto a depth of 6' should be carried out in the Buckingham Canal to see if the Canal bed when deepened would not heave up almost immediately to its pre-dredged level. Terminal facilities such as warehouses with proper compound walls should be provided at the Madras Wharf and Hood Wharf to ensure the security of goods and prevent unnecessary detention of boats pending realisation of tolls."

(Proposed allotment—Rs. 15 lakhs).

Andhra:

"Experimental dredging to a depth of 6' from Mile 179 to Mile 181 in the Buckingham Canal between Kothapatnam and the Mudigundi river or in some other reach where this problem is acute."

(Proposed allotment—Rs. 30 lakhs).

Letter No. IWT-EC-4(2)/57/3 dated 12th May, 1958:

In this letter we suggested that regular traffic surveys should be carried out immediately in the areas served by the following waterways:—

- (a) Waterways of North East Region.
- (b) Waterways of Orissa.
- (c) Waterways of Kerala.
- (d) Waterways of Mysore.
- (e) Buckingham and Vedaranyam Canals.

These traffic surveys whether undertaken by the Government of India or the State Governments should be under the overall control of the Ministry of Transport and Communications and should be conducted in close co-operation with the Central Ministry of Railways and Transport Commissioners under State Governments.

(Proposed allotment—Rs. 3 lakhs).

Letter No. IWT-EC-4(2)/57/4 dated 12th May, 1958:

In this we suggested that immediate investigations should be undertaken by the Central Water and Power Commission of the following more important waterways and rivers in India for obtaining hydrographical and other data:—

- (a) Ganga from Allahabad to Kanpur.
- (b) Yamuna from Allahabad to where the Chambal joins the Yamuna.
- (c) Godavari upto the confluence of Pranrita including Sabari.
- (d) Mahanadi from Cuttack to Dholpur.
- (e) Nerbada from the sea to the south of Hoshangabad.
- (f) Tapi from the sea to the south of Bhusawal.
- (g) Krishna.

(Proposed allotment—Rs. 7 lakhs).

Letter No. IWT-EC-4(2)/57/5 dated 12th May, 1958:

In this, we drew the attention to the fact that navigation aspect has been lost sight of in some of the multi-purpose river valley projects e.g., Hirakud and Tungabhadra Dams. We recommended that provision of navigation locks should be made in the reservoirs formed by the multi-purpose projects. The proposed Rajasthan Irrigation Canal should provide for adequate sized locks to allow expeditious transport and adequate head-room under the bridges. Similar consideration should apply to the Tungabhadra Left Bank Canal. Canals of multi-purpose project where there is reasonable traffic potential should also be developed for navigation. We also recommended that trees in the bedspread area of the reservoirs formed by multi-purpose projects should be cut down to the root before water is allowed to enter the reservoir.

(No allotment—provision to be made in the respective project reports).

Letter No. IWT-EC-4(2)/57/6 dated 24th May, 1958:

We strongly recommended that a technical organisation should be set up under the Ministry of Transport and Communications and a complementary organisation in the Central Water and Power Commission under the Ministry of Irrigation and Power to study and draw up schemes for development of inland water transport.

(Proposed allotment—Rs. 12 lakhs).

3.10. The proposals outlined above may be summed up in a nutshell as follows:—

		(Rs in lakhs)
(a)	Improvements of waterways of North East India	142
(b)	" Orissa	30
(c)	" Kerala	43
(d)	" Mysore	10
(e)	" Andhra	30
(f)	" Madras	15
(g)	Traffic Surveys	3
(h)	Hydrographic Surveys	7
(i)	Technical organisation	12
TOTAL		292

3.11. Unfortunately, due to financial stringency, the Planning Commission subsequently reduced the provision for inland water transport in the Second Five Year Plan from Rs. 3 crores to Rs. 1.42 crores and we were asked to suggest revised allotment of the reduced amount amongst the various schemes. We, accordingly, revised our various recommendations and suggested allocation of funds during the Second Five Year Plan period as follows:—

(a)	Immediate improvements to the existing waterways in North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras as follows:—	
	North East India	78
	Orissa	12
	Kerala	20
	Mysore	5
	Andhra Pradesh	10
	Madras	5
(b)	Immediate traffic surveys in the States of North East India, Orissa, Kerala, Mysore, Andhra Pradesh, and Madras	2
(c)	Immediate investigations by Central Water & Power Commission for obtaining hydrographical data of selected rivers in certain reaches capable of early development	4
(d)	Setting up of technical wings in the Ministry of Transport and Communications and the Central Water and Power Commission under the Ministry of Irrigation and Power	6
Total		142

The Committee also expressed the view that the expenditure on the conservancy of the Ganga, Sunderbans and the Brahmaputra including the Noonkhowa Shoal should be met from the Revenue Budget and not from the provision made for capital expenditure in the Second Five Year Plan.



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CHAPTER III

Inland Water Transport in Retrospect

4. India is gifted with several river systems like the Ganga, Brahmaputra, Indus, Bhagirathi, Hooghly, Mahanadi, Godavari, Krishna, Cauvery, Narbada and Tapti etc. History provides many examples of the important role played by rivers in unifying various regions. While these rivers had figured prominently as carriers of men and material in ancient India, water transport today thrives only in States like Bengal, Assam, Andhra and Kerala and to a limited extent in certain other States. In order to appreciate the present day problems and to plan for future developments, a survey of the historical background of the waterways of our country and some of the progressive countries of America and Europe, where water transport has come to play a vital role, is essential.

5. In the United States of America, development of rivers began as early as 1782. The introduction of steam propulsion in the beginning of the 19th Century gave further encouragement to inland navigation. Water transport through the Great Lakes also developed when grain and iron ore regions were opened up. The Canals constituted another means of transportation and with the success of Erie Canal in 1825, canal construction developed into a speculative boom but after 1880 water transport except on the Great Lakes, rapidly declined notwithstanding the abolition of tolls and by the end of the century steam vessels had practically disappeared from the rivers following the development of Railways mainly because of (a) poor organisation of water transport (b) natural obstruction to navigation, and (c) shifting the sources of supply of commodities especially suited to water transport.

5.1. A bold policy of active participation of the Government after the first World War had resulted not only in rehabilitating water transport but developing it as an essential mode for the economic development of the country. The recent opening of the St. Lawrence seaway may be quoted as an example of the policy adopted by the United States and Canadian Governments. Harnessing the Mississippi system and stabilising the Channels is another example of the systematic planning and hard work done by the United States Engineers for about 60 years backed by the technical and financial resources of a prosperous country.

5.2. Since 1920, the United States of America have spent 2 billion dollars in the creation and development of about 28,000 miles of waterways, 10,000 miles of which take over 9 Ft. draft and cost \$100,000 per mile. The resulting benefit to the country of this enormous expenditure of public revenues on the development of

waterways can be gauged from the following figures of annual traffic carried on these waterways exclusive of the Great Lakes:—

Year	Net tons	Ton miles
1931	179,735,000	9,233,362,320
1935	225,917,850	13,406,174,849
1940	366,835,582	22,411,961,000
1945	394,203,902	29,709,146,000
1947*	262,282,074	34,548,917,000
1950	297,694,832	51,656,637,000
1955	362,555,910	97,662,567,000

*The figures from 1947 onwards were compiled under the new statistical system which eliminated duplication more thoroughly than in the years prior to 1947. Hence the tonnage figures subsequent to 1947 appear low as compared to previous figures, but the ton mileage adequately indicates the enormous increase achieved.

5.3. Water transport in the United States has undergone phenomenal changes in recent years as both the Federal and State Governments now fully appreciate the part that inland water transport can and does play in the development of an integrated transport system geared to the overall requirements of their country. Power units have been made more efficient and economical through improvements in craft design and improved methods of propulsion and towage. Considerable progress has been made in the development of articulated push-tows and transportation needs of steel mills, cement factories, oil refineries, chemical plants, coal mines and numerous other industries are being met by these huge integrated river tows, some of which are longer than the largest ocean freighters and tankers.

5.4. Even in the early days, inland water transport was considered cheap, but, with the extensive progress that has been made in recent years in respect of craft design, etc., it has now come to be recognised as the cheapest form of transport. It is interesting to note that currently 15 per cent. of the total transport requirements of the United States is handled by this mode of transport, while the route mileage of the waterways is believed to be about five times that of India.

6. The territory of the Union of Soviet Socialist Republic is endowed with a net-work of numerous rivers and streams which are particularly suited to the development of inland navigation. Rivers such as the Volga and the Dniepar rank among the most important waterways of the world. Many of the chief tributaries of the main rivers rise close to each other while their estuaries are as far apart as the Caspian and Black Seas in the South and the White and Baltic Seas in the North. The short distances between the sources of the rivers facilitated easy transshipment by portage from early times.

The mercantile and state interests were, therefore, drawn to the problems of improving navigation along the main rivers by eliminating portage through the construction of connecting canals in the fairly level central plateau where the rivers rise.

6.1. The Institute for the study of the U.S.S.R. in its publication "Soviet Waterways" has clearly brought out the historical background leading to the present achievement of the U.S.S.R. in the field of inland navigation system. The possibility of connecting the Volga and the Don had been thought of as early as the 17th century. Development followed the requirements of commerce keeping pace with technical advances. By the end of the 19th century nine main waterway systems were in existence which included 19 ship canals with a total length of 801·15 kilometers (497·81 miles). With the development of water transportation and the creation of new waterways and improvement of existing ones, the idea of uniting the separate systems into a single system began to take shape in the early part of this century. Construction proceeded at an increasing pace from 1950 onwards in both the European and Asiatic portions of the country with all large-scale projects subordinated to the concept of a unified deep water transportation system in the U.S.S.R.

7. In Western European countries such as France, Germany, Holland and Belgium, there existed long before the advent of Railways a net work of river and canal waterways all of which were maintained by the State and extensively used for navigation. When railways were developed, waterways did not receive any set-back. This was entirely due to the fact that a co-ordinated development of these two modes of transport was planned.

7.1. In France, the standardisation Scheme of 1879 whereby the canals have been developed to standard measurements to accommodate craft of 280 tons carrying capacity has resulted in a net work of canals which to this day forms an efficient and economic means of transport. The French Waterways fleet grew rapidly in the beginning of the 20th century and a peak figure of 15,000 craft was reached in 1913. Development of other modes of transport had its effect on waterways to some extent resulting in the reduction of the craft. Although the fleet suffered severe damage during the war years, considerable rehabilitation has since taken place. The total length of Navigable waterways amounts to 7,993 miles, comprising 3,094 miles of canals and 4,899 miles of rivers. The importance attached to the development and maintenance of these waterways can be gauged from the budget figures for the year 1954 wherein provision had been made for an expenditure of 8,150 million Francs (Rs. 11 crores) against an anticipated income of 745 million Francs (Rs. 1 crore). In 1956 a traffic of 61·6 million tons was transported over these waterways.

7.2. In Germany, prior to 1875, the river Rhine and its tributaries were natural water courses with shallow depths and only the smallest vessels could navigate as far as Strasburg, 300 miles inland. Between 1875 and 1900, in spite of the fact that the existing industrial areas were already linked by rail, the German Government undertook a programme of river improvement and artificial waterway construction at enormous expenditure. This has resulted in the Rhine developing into a deep river taking barges

with a draft of about 9 Ft. as far as Cologne while vessels of 600 tons or more could navigate as far up as Strasburg. Equally striking improvements had been effected in the tributaries of the Rhine. The result of this bold policy was an immediate expansion of water borne traffic. The large scale expansion of industry in Germany was the direct result of the improvements and river training works carried out during this century between the two world wars. The Rhine is now navigable from Basle to the sea, over a distance of nearly 540 miles. The total length of navigable waterways of West Germany amounts to 3,197 miles comprising 2,430 miles of rivers and 767 miles of canals and traffic to the extent of 133.7 million tons had been transported by these waterways in 1956. In 1957, a sum of 270 million D. Marks (about Rs. 30 crores) had been budgeted for expenditure on inland waterways against a revenue of 54 million D. Marks (Rs. 6 crores). It has been found that as a result of the improvements, industries are developing alongside inland waterways and this had a decentralising effect on industrial settlements, besides regulating the freight rates.

7.3. Considerable financial outlay in effecting improvements to the waterways of Belgium, towards the end of the last century, had resulted in traffic increasing almost three fold thus adding to the prosperity of the country. The budget figures for the year 1957 are interesting inasmuch as the expenditure of 77 million Belgian Francs (Rs. 0.70 crores) as against the receipts totalling 73 million Belgian Francs comprising a subsidy from the Ministry of Transport to the extent of 50 million Francs while 21 million Francs represent the collection of 2½ per cent. gross freights. In 1956, traffic amounting to 55.0 million tons was transported over the waterways comprising 541 miles of rivers and 588 miles of canals.

7.4. The Netherland waterways have been so highly developed that the ratio of the length of navigable waterways to the populated area is the highest in the world. The unique and historic role of inland waterways has placed the Dutch system in a class by itself. Flood protection, land drainage, reclamation and water transport have all developed simultaneously. A canal system has been developed throughout the country. Notwithstanding the highly developed road and rail transport, the canals play an effective role in the transport system of Amsterdam city. An expenditure of 221 million H.Fl. (about Rs. 27 crores) had been budgeted in 1957 against an anticipated revenue of 3.7 million H.Fl. (about Rs. 0.5 crore). Traffic to the extent of 121.9 million tons was carried over the waterways comprising 692 miles of rivers and 3,514 miles of canals.

7.5. In spite of the degree of attention paid to the waterways of these countries of Europe, they passed through a difficult stage in the slump period between the two world wars, but water transport has now been developed into a flourishing and vital mode of transport in these countries mainly because of the bold policies adopted by the countries of promulgating measures to divert adequate State funds for improvement of waterways and to encourage development of industries in close proximity.

7.6. The history of inland water transport system of Great Britain contains ample evidence of the varying fortunes of inland waterways during the past two centuries. At the beginning of this century, there were about 3,000 miles of canals in addition to 2,000 miles of navigable rivers. According to the "Commercial Intelligence" dated 24th August, 1901, no less than 21 through routes existed between London and the manufacturing districts at the close of the canal boom of 1845 when many of the companies concerned paid handsome dividends. The policy followed by the Railway Companies after 1845 to acquire the waterways with a view to extinguishing their rivalry led to the state of utter neglect of the waterways in the beginning of the present century. The problems of British waterways and canals and the historical background thereof have been set out lucidly in a paper read recently before the Metropolitan Section of the Institute of Transport by Mr. W. L. Ives, Principal Traffic Officer, British Waterways. According to him, although the Industrial Revolution could not have occurred in Great Britain as it did but for the "Canal era" from 1760 to 1830, the prosperity of the canals was short lived and from 1830 onwards their position began to deteriorate steadily. Several Committees were constituted from time to time to carry out a comprehensive survey of the conditions of inland water transport. All these Committees reported on the extent the canal systems in various regions had deteriorated and the adverse effects of competition from other modes of transport which forced down the waterway rates to uneconomic levels. As a remedial measure, some of these committees advocated the policy of public ownership for this industry, with financial assistance from the Government. In spite of the recommendations of these committees, little was done to remedy the situation until the passing of the Transport Act of 1947 which placed the waterways under the control of the British Transport Commission. A new Committee appointed under the Chairmanship of Mr. Leslie Bowes to enquire into the economics of the entire system on a broader basis has now suggested the creation of an Inland Waterways Corporation to manage the entire system of inland waterways instead of the British Transport Commission which is pre-occupied with the management of road and rail services.

7.7. There are about 2,400 miles of navigable inland waterways in Great Britain of which about 1,000 miles are navigable by narrow boats not exceeding 7 Ft. in width with a carrying capacity of 25 to 30 tons, while 600 miles of waterways are hardly used by Commercial traffic and the remainder are broad waterways (canalised rivers) which can be used by craft from 50 to 400 tons capacity. The British Transport Commission is responsible for 2,164 miles of these waterways, of which 1,430 miles are in commercial use and although bulk of traffic is carried by independent carriers or traders, the Commission owns a few tugs and barges.

8. In India, river valleys were cradles of civilization and waterways were the main means of communication. A very lucid review of the historical background and the present position of inland water transport has been given in the 61st Report (1956-57) of the Estimates Committee of the Lok Sabha on inland water transport under the Chairmanship of Shri Balwantray G. Mehta.

8.1. The 19th century can be truly called the era of canals and waterways as they formed the main arteries in the transport system of the country. The introduction of steam vessels in North East India during the early part of this century completely revolutionised inland water transport and assisted in the growth and development of the indigo industry in Bihar, the jute industry in Bengal and the tea industry in Assam, Sylhet and Cachar Valleys and brought down the produce of these areas to Calcutta for distribution to world markets. It was about the middle of this century that the great pioneer of irrigation works and canals in India, Sir Arthur Cotton, went about with the gospel that "water is incomparably India's greatest treasure and were this generally turned to account, she would be in the highest state of temporal prosperity." He proposed a net-work of navigable canals and rivers for the entire country as a "Master Plan for Navigation." The greater part of this plan could have been executed at that time as the withdrawals for irrigation were low and would have succeeded in attracting industry to close proximity of waterways but the Government of the day did not pay adequate attention as they were greatly interested in helping the private Railway companies whose dividends had been guaranteed by them. As a result of the initiative of Sir Arthur Cotton, a number of irrigation-cum-navigation canals were developed all over the country forming a net-work of communications. Some of the irrigation canals such as the Ganga and the Jamuna canals, however, soon revealed that they could not adequately serve the interests of navigation and irrigation at the same time. The withdrawal of water from the Ganga resulted in the rapid decline of navigation in its upper reaches in the dry season.

8.2. With the active encouragement given to the Railway at the cost of water transport, important towns, trading centres and industries developed along areas in close proximity to the railway lines and loading and unloading stations along the canals and other waterways ceased to attract trade and began to lose their importance. The end of the 19th century saw the Railways in a state of absolute prosperity driving the less organised water transport out of business except in regions such as in North-East India, where, by virtue of natural advantages of a net-work of waterways and the difficulty of bridging mighty rivers like the Ganga and the Brahmaputra and the numerous off-shoots in the deltaic regions of Sunderbans, steamer companies which had organised themselves on sound commercial lines continued to prosper. Other regions where inland water transport continued to thrive were the backwaters of the West Coast and the Krishna and Godavari deltas where similar advantages gave them considerable support.

8.3. With the active encouragement given to the Railway system and in the absence of adequate measures to maintain the waterways, gradual decline of inland water transport, became inevitable. The advent of the first World War and the shortage of Railway and shipping facilities gave some importance to inland water transport and attempts were made towards better maintenance of some of the waterways such as the canals along the East Coast. Similar shortage of rail and road transport during the Second World War again focused the attention on the state of the waterways. Improvements in maintenance of some of the canals were effected which helped to

solve the transport problems to a small degree in that region. It was realised that had there been in existence a commercially developed water transport in the various regions in India or if one could have been subsequently organised, many transport and supply problems might have been avoided. Sustained efforts to maintain the waterways, quite apart from undertaking some improvements, were unfortunately, conspicuous by their absence. With the guiding principle of balancing expenditure by revenue from tolls etc., it was inevitable that a vicious circle should set in. While expenditure was curtailed to the barest minimum to keep well within income, inadequate maintenance of waterways and high tolls charged, discouraged large scale operation on a number of waterways thus resulting in decrease in the volume of traffic and deterioration of the waterways. The absence of technical staff in the States concerned has been largely responsible for the policy of laissez-faire during the past 100 years with disastrous consequences to inland water transport.

8.4. Soon after the advent of independence, the Government of India in the Ministry of Transport convened an inter-state conference of the States of North East India. The principal object of this Conference was to devise measures to put inland water transport on a firm footing in this region. The Minister of Transport who presided over the Conference made the following policy statement:—

“Government are interested in co-ordinating all forms of transport, river, road and railways; and that, if the river services are found to be better suited to meet the needs of a particular area, Government would be prepared to consider its development even in preference to Railways or to make Railways co-ordinate their activities with the river services so as to enable the two to work in collaboration and that there will be no question of the Railways pulling one way all the time away from the river services.”

8.5. A questionnaire was subsequently issued to all the State Governments with the object of making a preliminary survey of the water transport potential of the Indian Union. This was followed by visits to India of Mr. Otto Popper, an expert of the ECAFE to advise on the water transport development in North East India and Mr. J. J. Surie a United Nation's Consultant to advise on a Pilot Project for experiments with shallow-draft craft on the Ganga and the Ghagra rivers. The representatives of the Government of India also participated in the study tour organised by the Economic Commission for Asia and Far East to Europe and America in 1951. The Ganga Brahmaputra Water Transport Board was set up in 1952 with representatives of the Governments of Uttar Pradesh, Bihar, West Bengal and Assam as members, for development of navigation of inter-state rivers in North East India.

8.6. Many factors such as reduced depths due to withdrawals of water for irrigation, restricted river training schemes, lack of dredging and un-co-ordinated construction of railway lines on both banks of the river, which naturally attracted industries and traffic and facilitated quicker transport, contributed to the gradual decline of water transport services on the Ganga. The partition of the country,

which completely altered the trading conditions between East Pakistan and North East India progressively made inland water transport services on a large scale on the Ganga un-economical resulting in their final closure on 1st January, 1958.

9. The history of decline of inland water transport is not peculiar to India. In the United States of America and European countries, the industry also deteriorated over a considerable number of years, but its inherent value was appreciated very much earlier in those countries than in India, resulting in its revival and development. These countries were able to overcome the difficulties by the Governments assuming direct responsibility for maintenance, development and expenditure on the following lines:—

- (a) adequate maintenance and constant improvement of existing waterways,
- (b) emphasis on indirect benefits to State and the community of improved communications,
- (c) river training measures for important navigable rivers and construction of retention dams to increase the dry weather flow,
- (d) creation of new waterways,
- (e) co-ordinated development of various forms of transport and allocation of traffic.
- (f) establishment of industries alongside waterways, and
- (g) advancement in technical methods of operation and craft design.

9.1. One of the factors in favour of water transport flourishing in Europe and America is the well distributed rainfall throughout the year. Consequently, there is little or no need for withdrawals of water for irrigation. The rivers have adequate discharge throughout the year, with no violent fluctuations in water levels in the two seasons as in India, where we depend almost entirely on the monsoon which provides rain for a few months with a dry spell for the rest of the year. In the prevailing conditions irrigation, which is essential for increased food production, has to be given priority even within our meagre supplies of water.

10. In India, the Railways have for over three quarters of a century enjoyed complete monopoly and have provided a quick, cheap and useful form of transport. They have planned to increase their capacity from 85 million tons to 180 million tons per year by the end of the Second Five Year Plan and a sum of Rs. 1,121.5 crores has been allocated for improvements. It has been estimated in some quarters that the transport requirements of the country would considerably exceed the target of 180 million tons planned by the Railways by the end of the Second Plan. With the present drive in exports particularly with regard to iron ore which is one of the important foreign exchange earners and the development of the new steel plants and other industries, the transport requirements are likely to exceed

the original targets and other modes of transport namely coastal shipping, highways, and inland water transport will be required to co-ordinate with the Railways in meeting the increased transport requirements of the country. The following extract from a report of the International Bank for Reconstruction and Development (Economic Mission to India in 1956) is interesting:

"We are deeply concerned about the transport situation. As we travelled about the country, we were impressed again and again by the inability of the railways to cope with the existing traffic, and by the congestion in the ports, which was itself partly due to inadequate rail facilities. While the plan contemplates a substantial increase in railway investment, and port congestion is being relieved to some extent by expansion of physical facilities and the introduction of incentive schemes for stevedoring labour, we are by no means fully assured of the adequacy of these measures. We urge that the Government review its whole transport policy and programme with a view to maximising transport by all available means—by rail, roads, coastal shipping and inland waterways."

10.1. It is in this context that inland water transport has an important role to play. This is largely due to the fact that it can both supplement and complement other modes of transport and is particularly suited for transporting commodities in bulk such as coal, ores, oil, steel, machinery, chemicals, building materials and food grains. The value of an inland waterway connecting the hinterland to a Sea Port is well known. Some of the largest ports in the world such as Rotterdam, Antwerp, New Orleans and Calcutta, are to a great degree dependent on this vital mode of transport. Apart from serving long distance haul of traffic by the connecting waterways, inland water transport also provides short distance lighterage between the industrial establishments and shipping in a port as in the case of London and Calcutta. During the congestion in the port of Calcutta in 1957, lighterage facilities played a very important part in improving the situation.

10.2. Although in terms of speed in miles per hour inland water transport is slower than other modes of transport, it is possible to move a greater quantity of traffic between any two points within a specified time than by any other method provided the waterways are well maintained. The capital and maintenance cost of inland water transport compare very favourably with other modes of transport (*vide* Appendix II).

CHAPTER IV

The Waterways of North-East India—Their problems and suggestions for improvement

11. Of the various waterways in India, the rivers of North-East India have, by virtue of the largest mileage and the biggest tonnage transported, carved a unique place for themselves in the country's transport system. The rivers concerned are the Brahmaputra and the Ganga with their tributaries, the Bhágirathi, and the Hooghly forming altogether nearly 4,000 miles of inland waterways through a net-work of delta rivers and creeks in the Sunderbans. The hydrology of these two mighty rivers which are subject to considerable seasonal fluctuations in discharges, meanders and instability of channels and banks, differs in many respects from those of Europe. Control of our rivers on the scale carried out for European and American rivers may be possible only when multi-purpose dams and reservoirs are constructed on the tributaries at an enormous cost but the return will more than repay the capital outlay in many different ways as has been proved in the aforementioned countries.

Assam:

12. The State of Assam is connected to the rest of the country through a narrow strip of territory with a minimum width from the Indo-Pakistan border to the foothills of the Himalayas of approximately 12 miles. When the country was partitioned, through railway communications between Assam and the rest of India were disrupted, and to remedy this, the Government of India undertook the construction of the Assam Rail Link which was completed in 1950. The Link passes through difficult terrain and has posed many problems in maintenance as it is vulnerable during the monsoons. Severe breaches occurred in the years 1950, 1952, 1954 and 1955 as a result of which traffic to and from Assam had to be suspended for some time. The duration of breaches occurring each monsoon in recent years is as follows:—

Year	Duration of breach	Cost of repair work
	Days	Rs. in lacs
1952	36	68.72
1953	7	Not available
1954	114	113.32
1955	64	38.03
1956	2	0.32
1957	4	5.85
1958	7-8	6.21

12.1. Apart from the financial loss to the Railways, the impact of these breaches on the economy of the State is considerable as these occur during the season for export of tea and jute. Measures to stabilise the difficult portion of the Link are now being undertaken at considerable cost (about Rs. 6 crores), but it is unlikely that complete immunity from such breaches can be permanently achieved. Road communications are similarly affected for some 3 to 4 months each year. Swollen rivers wreak havoc on the highways between North Bengal and Assam.

12.2. These very rivers which impede the operation and development of overland transport are, however, simultaneously a great natural gift to North East India, forming as they do the highways over which the bulk of the region's produce is transported. In particular, the State of Assam is largely dependent on inland water transport to import the vast tonnages of goods annually consumed by industry, the general public and as required by the rapidly growing development projects. As to exports, the State is almost entirely dependent on this form of transport which carries 93 per cent. of her tea production and 90 per cent. of her jute crop for onward distribution to the nation and the world's markets. These two commodities represent India's largest foreign exchange earners and without inland water transport services the national economy would be crippled.

12.3. The present capacity of the Assam Rail Link is 190 metre-gauge wagons each way per day, roughly corresponding to 1900 tons. Representatives of the North East Frontier Railway have intimated that their target for the present plan period is 500 M.G. wagons per day on the Katihar-Siliguri Section and 400 M.G. wagons per day or 4,000 tons from Siliguri onwards into Assam. The total transport requirements of Assam, Cachar and Tripura, based on the statistics of 1957, amount roughly to Imports of 11,08,110 tons and Exports of 8,90,750 tons as shown below:—

	By rail Tons	By river (All companies) Tons	Total Tons
Imports	5,09,980	5,98,130	11,08,110
Exports	4,74,930	4,15,820	8,90,750
TOTAL	9,84,910	10,13,950	19,98,860

12.4. The above shows that in 1957 the imports into Assam by rail amounted to 140 M.G. wagons per day. Towards the end of the Second Plan period the estimated requirements of Assam according to their Trade Adviser, is 190 M.G. wagons per day. To this has to be added the considerable movement of coal and stores of the North East Frontier Railway and Military traffic, also the movement of materials required for the Pandu bridge, Assam pipeline and the oil refinery. By 1960-61 the State Government estimate their total import requirements (including coal, railway and military stores) on the Fakiragram-Amingaon Section as 350 M.G. wagons per day. Account has also to be taken of 80 large empty tank wagons that are currently moving in the same direction, and a further 100 or more such wagons (2,000 ton capacity) that will be moving on completion of the Assam Oil Refinery in 1962.

12.5. The Railway Board's plans for the Assam Rail Link have been made with a view to providing the maximum capacity possible for use in case of emergency, but it is clear that Assam will have to continue to depend on the river transport system as hitherto not only for its export of jute and tea, but also for the large tonnage of by-products from the new oil refinery, the expanding timber production and various other transport requirements connected with the industrial and economic development of the State.

12.6. The main products of Assam are oil, jute, tea, timber products and coal. About 93 per cent. of Assam's tea crop and 90 per cent of jute is transported to Calcutta by river transport. The following statements showing the production of tea, the quantities exported and the foreign exchange earned since 1953 indicate the importance of water transport to Assam which, by transporting about 400 million lbs. of tea, contributed to a large measure, to the peak foreign exchange of Rs. 142.8 crores earned by tea in 1956 out of the total foreign exchange earnings of Rs. 582 crores:—

STATEMENT I

Production of tea in India since 1953

(Data supplied by Tea Board, India)

Year	(Figures in thousands lbs.)		
	North East India	South India	Total
1953	493,731	120,867	614,598
1954	522,948	128,530	651,478
1955	549,419	128,952	678,371
1956	553,673	126,937	680,610
1957*	530,939	144,692	675,631
1958*	564,400	157,000	711,400

*Provisional

N. B.: About 400 million lbs. of tea is transported from Assam to Calcutta by inland water transport.

STATEMENT II

Total quantities of Indian Tea exported and the foreign exchange earned since 1953:

Year	Qty. in thousand lbs.	Value in thousand Rs.
1953	500,655	1,042,073
1954	447,960	1,307,523
1955	367,523	1,136,132
1956	523,557	1,428,24
1957	442,651	1,233,858
1958	507,600	1,374,000

12.7. Although the rates for carriage of tea from the tea gardens in Assam to Calcutta by inland water transport currently stand slightly higher than by rail, despatch by inland water transport is preferred by the tea producers because of the advantages of transit time of about 7 days by river against 15 to 20 days by rail. Furthermore the tea transit sheds and other tea warehousing establishments in Calcutta are set up for operation in conjunction with water transport. If any circumstances compelled the routing of the entire or a substantial part of this traffic to the railway, a state of severe congestion in the Calcutta Port area would occur.

12.8. Assam has a vast internal waterway system. Approximately 1,000 miles are navigable by steamers and large country boats while a larger mileage of waterways can be covered by small country boats. These waterways fall mainly in the two important valleys of the Brahmaputra and Surma.

12.9. The Brahmaputra is the main artery of the State; it flows down the centre of the Assam Valley for a length of 450 miles. It receives a number of tributaries which are also navigable for varying distances from their mouths. The Subansiri, the Dehing, the Burhi Dehing, and the Desang are important among these. There is a considerable variation in the discharge and levels of the main river between the monsoon and dry seasons, the levels varying by about 30 Ft. Current velocities are on an average of 5 to 6 miles per hour in the monsoon season except for one or two local areas where faster currents are experienced for two to three days at a time in spate conditions. During the dry season currents are approximately two to three miles per hour. In the monsoon season communications by road and rail are disrupted and the State becomes almost entirely dependent on water transport. The river in flood carries a considerable amount of silt, as also floating debris, snags etc., which present certain difficulties to navigation but are safely contended with by the operators who have years of experience of the region. For instance these conditions have influenced their choice of paddle propulsion in preference to screw. The wide variation in river levels causes certain serious problems such as bank erosion, disruption of loading and unloading operations at transshipment points. They also result in instability of the channels but the operators responsible for the conservancy of the river effectively tackle these problems with indigenous training measures.

12.10. The earthquake of 1950 set up considerable changes causing deterioration of the river channels particularly in the upper reaches. Before the earthquake, for about 100 years a regular steamer service operated up to Dibrugarh throughout the year at a draft 5'-3". After the earthquake, the main-line services were terminated at Deshang-mukh 46 miles down-stream of Dibrugarh, and a feeder service at a draft of 4'-0" was introduced up to Dibrugarh. Since 1956, however, this feeder service also has had to be withdrawn, mainly for lack of suitable feeder craft and berthing sites, the protection works at Dibrugarh having induced siltation along the town bank leaving no suitable area for berthing as far as Bogi Bheel about 12 miles from the town.

12.11. The present operational drafts may be summarised as follows:—

	H.W. season June-October	L.W. Season November-May
Lower Section (up to Tejpur)	6'-6"	5'-3" to 6'-0"
	June-September	October-May
Upper Section (above Tejpur)	6'-0"	4'-9" to 5'-6"

The Key shoals which govern these drafts are:—

- (a) Upper Section.
Banaria and Benganati Sholas.
- (b) Lower Section.

Kurwa, Kholabanda, Goalpara and Noonkhowa. The last named shoal at Noonkhowa, is situated at the Indo-Pakistan border downstream of Dhubri and has been the source of considerable difficulty and delays at various times. Between the 8th and 20th of April, 1958, 70 vessels with nearly 30,000 tons of essential cargo were held up at one time. It has been estimated by the Joint Steamer Companies that in the low water season of 1957-58 a total loss of transport capacity of about 90,000 tons representing about 12 per cent. of their annual carrying capacity was suffered due to this shoal. These difficulties largely arose through unco-ordinated navigation of the shoal area but in the 1958-59 L.W. Season, and effective co-ordination was introduced with the agreement of all operators. Simultaneously, river training measures were intensified primarily through the location of sternwheelers for scouring. In consequence of these measures, operation over the shoal was greatly improved and there were only two very brief stoppages in the entire low water season.

12.12. The rivers of Surma Valley, have been deteriorating progressively for some years especially during the low water season. They are mainly rainfed and due to excessive deforestation of the surrounding Cachar hills coupled with increased grazing in the lower catchment areas, there has been an increasingly rapid run off during the monsoons with diminishing conservation of water supply to feed the rivers in low water season. There are several shoals between Silchar and Karimgunj which restrict drafts of even the feeder steamers during the dry season, Kuttagong shoal being the most trouble-some. Prior to 1953, large Cachar Sunderbans service despatch steamers, with a draft of 6' used to navigate upto Fenchugunj in East Pakistan in the low water season but as a result of a breach which occurred in the lower reaches of the river downstream of Fenchugunj in Pakistan, the transshipment point from the despatch steamers to feeder rivers in the dry season had to be moved further downstream to Marcoli. As a result, the feeder services have now to terminate at Karimgunj instead of Silchar so as not to reduce the quantum of traffic requiring to be handled. The deterioration of the stretch of the river between Karimgunj and Silchar has also necessitated the termination of the feeder service during the dry season.

12.13. In the current low water season the East Pakistan I.W.T. Authority has undertaken a dredging programme in the Fenchugunj area, mainly in connection with their industrial projects at this site, and this is expected to have important beneficial effects on this channel. The Joint Steamer Companies are hopeful of reverting their mainline transshipment point back to Fenchugunj, in which event the low water season service to Silchar would be restored.

12.14. In spite of the heavy quantum of traffic handled at Gauhati, Pandu, Neamati and Dhubri on the Brahmaputra and Karimgunj on the Kushiyara, terminal facilities at these ports are primitive. At Fancy Bazar Ghat at Gauhati, considerable difficulties are being experienced by some I.W.T. operators due to complete absence of facilities. The approach road connections between the main road on the high bank maintained by the State Government and the ghats are deplorable and some of the operators are forced to maintain these approach roads and recover the expenditure from shippers. Lack of adequate terminal facilities has been a serious handicap to the economic development of water transport.

12.15. All I.W.T. craft operating between Assam and Calcutta have to be checked by Customs and Police authorities. There are five such check posts two in India and three in Pakistan. Lack of residential and office accommodation and launches has led to considerable delays in custom formalities resulting in unnecessary detention to I.W.T. craft.

12.16. It has been amply shown that the physical and geographical conditions of the north-east region of India have made waterways the best suited form of transport for the area, particularly since partition. Waterways will continue to serve the main needs of this region as they have done for centuries past. It is essential that measures be adopted for maintaining the waterways and improving them wherever possible by intensive bandalling assisted by dredging together with the removal of snags and other allied measures. The objective should be to reduce the uncertainty of drafts and navigability at key shoals with a view to ensuring a minimum 6' draft waterway throughout the year. The three main shoals in the Brahmaputra are Banganati, Kholabanda, and Noonkhowa. Although the position of the shoals varies longitudinally over a distance of about 25 miles, the actual length of the shoals is small but no records of the changes taking place in the configuration of the river from year to year which is responsible for the formation of these shoals are maintained. We, therefore, suggest that the following steps should be undertaken without delay.

12.17. Aerial photography of the Brahmaputra for a stretch 20 miles long and 15 miles wide in the vicinity of the shoals should be undertaken in October-November each year. This should be followed by hydrographic surveys in the dry season and the following flood season on the basis of which detailed plans for bandalling and dredging and long term training of the river could be carried out. These aerial surveys should be carried out for a period of at least 5 years to enable the organisation dealing with the conservancy of the river to anticipate the trends of changes and plan accordingly.

12.18. The conservancy of the river must no longer be the responsibility of any private operator but Government should accept full responsibility. The annual recurring expenditure for bandalling, snag clearing and marking of channels is likely to amount to about Rs. 10 lakhs. Government may appoint agents initially but they must gradually prepare themselves to take over this responsibility. Dredging will be necessary to maintain adequate depths over the key shoals in the Brahmaputra and Cachar services.

12.19. Pending finalisation and implementation of the schemes for the improvement of waterways, draft restrictions, which take into consideration the available navigable depths over shoals are essential and these restrictions should be rigidly enforced at Chilmari for vessels entering Assam and at Neamati, Gauhati or Dhubri for vessels outward bound. This will obviate any disruption of waterborne traffic vessels disregarding the prevailing draft limitations and blocking the channel.

12.20. The following terminal facilities should be provided:—

- (a) The first phase of construction of an inland port with modern facilities at Pandu, with adequate terminal facilities for heavy lifts etc., should be proceeded with, without any further delay, during this plan period and the entire project completed in the next plan period.
- (b) The foreshore at Gauhati should be raised and pitched and parking space for lorries should be provided.
- (c) The State Government should maintain all approach roads to steamer ghats.
- (d) Plans for construction of a Port at Dhubri, where training works will be necessary should be prepared after detailed field surveys for implementation in the next plan period.
- (e) Plans for provision of Port facilities on the Kushiya should be finalised so as to commence work early in the next plan period.
- (f) At Neamati where possibilities of permanent Port facilities appear to be remote due to instability of the site, light pre-fabricated aluminium transit sheds, which are portable, should be adopted. The possibilities of providing similar structures at a number of existing ghats should be investigated.

12.21. Extensive afforestation measures in the catchment areas of the rivers of the Brahmaputra and Surma valleys are essential to prevent excessive run off and reduce the silt charge. The construction of retention dams on the tributaries of the Brahmaputra in connection with the multi-purpose development of the valley should be explored. These will cut off peak discharges and ensure adequate dry weather discharge and improve navigational potentialities of a number of rivers.

12.22. It was apparent to the Committee that inspite of the considerable length of the waterways in Assam and the number of inland vessels plying, repair facilities available were meagre. No doubt this has been due to the fact that all vessels trading to Assam are based in Calcutta, which meets all repair requirements more economically. For emergencies, however, and in the interests of the internal development of the State of Assam, it is desirable that a certain expansion of repair facilities be considered. The Joint Steamer Companies, with the closure of their Bihar Services, have recently transferred their Floating Workshop from Patna to Gauhati. In the absence of dry docking facilities, this workshop can serve a limited purpose. It is therefore necessary to provide a suitable slipway or a dry dock with ancillary facilities. Tentatively a site for a slipway has been selected at Pandu, but it is felt that the great variation in water level would make a floating dock more suitable economically and technically than a slipway. This would be a matter for study in detail by the organisation undertaking the establishment of the proposed facilities.

12.23. As in all other States inadequate attention is paid to ferries. This has resulted in numerous accidents involving loss of life. It is essential that the State Government should take over the responsibility for operation of efficient, safe and river-worthy ferry services across the main rivers on the lines suggested by Mr. Surie, the United Nations' Consultant. Shipyards in India are capable of constructing such ferries up to any size suitable for operation on the Brahmaputra, and only the engines would have to be imported, the foreign exchange component thus amounting to approximately 40 per cent. of the cost of the vessel. A Calcutta Shipyard is currently constructing two ferry craft for the Assam Government which are understood to be as good as any foreign built craft.

12.24. Hydrographic and traffic surveys should be undertaken with a view to developing feeder services:—

- (i) On the Katakhal and Whaleswari in Cachar.
- (ii) Between Desangmukh and Dibrugarh on the Brahmaputra.
- (iii) Extension of the Feeder Service upstream of Bordutti on the Subansiri.

Wherever possible, introduction of modern shallow draft powered craft on such services should be encouraged. Where these are not possible, utilisation of country craft towed by shallow draft tugs to run on co-operative basis with active participation of the boatmen and the State Government, is suggested for operation to feed the main I.W.T. service.

12.25. Detailed investigations with regard to construction of a lock to enable traffic to enter the Kushiara river from the Longayi river through the Natiyal Khal which has been bunded as a flood protection measure, should be carried out. The resectioning of the Natiyal Khal and arrangements for flushing the Khal should be planned in the light of these investigations.

12.26. Any conservancy measures and improvements contemplated on the Brahmaputra and Barak rivers (and Sunderbans) will be governed by corresponding measures being adopted in the linking waterways in East Pakistan. The Pakistan Government have from late last year established an I.W.T. Authority to deal with these aspects in East Pakistan. It is desirable that a close liaison be established with this Authority as early as possible.

West Bengal:

13. One of the most important waterways in the country today is the river Hooghly which is formed by the confluence of the two Nadia rivers, spill channels of the river Ganga, about 80 miles upstream of the Port of Calcutta. These two rivers known as the Bhagirathi and the Jalangi were once very active navigable waterways forming perennial navigation links between the Port of Calcutta and its vast hinterland of Assam and Upper India but have now been relegated to spill channels receiving upland water for about 3 to 4 months in a year only. The Bidhadhari and Matla rivers have also deteriorated in more recent years resulting in gradual shifting of the route through Sunderbans more towards the seaface and thus increasing the route mileage. The river Hooghly is the scene of considerable activity of lighters and tugs transporting jute, gunnies and other commodities between ships berthed in Docks and riverside berths and jute mills spread out along both banks of the river upstream and downstream of Calcutta, in addition to the I.W.T. craft operating between the Port of Calcutta and North East India.

13.1. The Port of Calcutta, situated on the left bank of river Hooghly, is the most important port as it serves as the natural outlet of India's coal, jute, tea, in addition to ores and other products of the States Uttar Pradesh, Bihar, Orissa, West Bengal and Assam. With location of the three new steel plants at Rourkela, Bhilai and Durgapur and the considerable expansion of the existing plants at Burnpur and Jamshedpur and the possibility of a fourth steel plant being located at Bokharo, the hinterland of the Port will be further industrialised. The Port at present handles annually about 10 million tons and more than 10 per cent. is carried by inland water transport. This Port is thus vital to the inland water transport system of the country. Due to inadequate upland water supply the conservancy and maintenance of the approaches to the Port of Calcutta is presenting a serious problem, thus threatening the very existence of the port of Calcutta. Immediate remedial measures to ensure perennial head water supply are therefore necessary. This can only be done by constructing a barrage on the Ganga. In this connection it is relevant to reproduce the statement made by the Deputy Minister for Irrigation and Power on the 2nd September, 1958, in the Parliament:—

“The Ganga Barrage is not a new project. It was advocated by the eminent engineer, Sir Arthur Cotton, over a hundred years ago in 1853. Owing to the diversion of main stream of the Ganga to the North, Calcutta Port had already begun to suffer from insufficiency of headwaters and Sir Arthur Cotton advocated a barrage at Rajmahal with a canal from the Ganga to the Bhagirathi

to supply fresh water to the Hooghly.

Again in 1928-1930, Sir William Wilcocks stated that a barrage on the Ganga would be needed in time to come, but proposed the immediate construction of a weir if the barrage was considered too expensive. Conditions gradually became worse and in 1946, when the Bhagirathi was connected with the Ganga for only 2-3 months in a year, Mr. A. Webster, Chief Engineer (Special), in his report on the future development of the port of Calcutta, reemphasised the need to take all possible steps to improve the headwater supply of the Hooghly on which depended the very existence of the Port of Calcutta.

Solution for Calcutta Port Problems:

“The Government of India are most concerned over the progressive deterioration of the navigable sea-route of the Port of Calcutta owing to the heavy siltation occurring in the river Hooghly, especially since 1919. The Port Commissioners have been tackling this problem by intensive dredging and costly training works, but these measures are not proving adequate for maintenance of the navigable depths to the extent necessary.

“The question of a permanent or long-term solution of the problem has, therefore, been re-engaging the attention of the Government. Recently, Dr. W. Hensen, a German Expert, made a comprehensive investigation, affecting among other things, the problems of the Port of Calcutta, the Hooghly and the Bhagirathi.

“There is a general consensus of opinion that the channels of the Hooghly and the Bhagirathi will progressively deteriorate, if they are left to themselves, and that the most effective method of stopping the long-term deterioration is by regulation of upland supplies to the Hooghly through Bhagirathi, by the construction of a barrage on the Ganga at Farakka. Such a barrage would also reduce the frequency and intensity of the bores which have noticeably affected the handling capacity of the Port.

“The increased upland supplies, would, besides improving navigation, reduce the salinity of water at Calcutta for drinking and industrial purposes, flush out the dying channels, improve sanitation, reduce flood hazards and improve the communication facilities. The navigability of Calcutta Port is also linked with the navigational facilities in the Ganga which is a vital line of communication both for India and Pakistan.

Expeditious Decision on Scheme:

“The Government is fully seized of the problem of the deterioration of the Port of Calcutta, which, apart from being an important international link, is vital not only to the economy of West Bengal but also to the whole of India.

"The surveys and investigations in connection with the Ganga Barrage Project have now been in progress for some years and are now in an advanced stage. The House will appreciate that a decision on an undertaking, which is estimated to cost over Rs. 56 crores, has to be proceeded by collection of the necessary data and comprehensive examination of the technical financial and other aspects of the project.

"Such an examination naturally takes time. I may, however, assure the House that everything possible is being done to expedite a decision on the scheme."

13.2. The Sunderbans area is intersected by numerous streams and large rivers. Nature has provided navigable cross channels connecting the estuaries of rivers. Inland water transport is the only means of communication in this area. The Matla is the most important of the rivers of the Sunderbans and was once considered as an alternative to the Hooghly. Do-Agra Khal, a narrow creek running East and West connecting channel creek with the Saptamukhi is the only link connecting Calcutta with Assam and Upper India. The entrance to this Khal is narrowing down in recent years and requires dredging. In the Sunderbans area, premature reclamation of vast areas by marginal embankments to prevent inflow of tidal water has caused deterioration of a number of channels. This has also resulted in frequent flooding and breaching of bunds and a threat to the drainage of the region. The navigable route has also shifted sea-wards reaching the southerly limit permissible for safe navigation. Beyond this limit, crossings at large river mouths are open to the Sea and the South Westerly Monsoon winds which make passages by I.W.T. craft across them hazardous. At Behari Khal, on the Indo-Pakistan border in the Sunderbans, the Custom and Police are housed in a house boat. Lack of launch facilities is causing considerable delays to I.W.T. operators affecting their turnround.

13.3. Of the other rivers of West Bengal, besides the estuaries of tidal rivers and creeks in the Sunderbans area, only the Rupnarain river, which has its outfall into the river Hooghly at Geonkhali can claim to be a navigable river. In the past, considerable river traffic consisting of country boats and launches drawing about 5 Ft. used to ply in this river. At present navigation downstream of Kolaghat Railway Bridge is restricted by a shallow reach, and the ferry service which used to ply between Calcutta and Kolaghat bridge now runs only a few miles up the Rupnarain. Upstream of Kolaghat, there is a regular ferry service and launches drawing 1½ ft. ply upto Ranichak 17½ miles upstream of Kolaghat bridge during the dry season and upto Ghatal further upstream during the freshets. The deterioration in the navigable conditions of the stretch between Kolaghat and the outfall of the Rupnarain can be attributed to considerable changes which are continuously occurring between the constructions at Kolaghat bridge and Geonkhali at the mouth of the river, due to which the river has become abnormally wide with consequent loss of navigable depths.

13.4. The Circular and Eastern Canals commence from Chitpur lock on the Hooghly river and extend upto Hasnabad and the Jamuna river. Prior to partition, this canal system provided a useful navigation route to country boats plying between East Pakistan and Calcutta and enabled them to avoid the dangerous and exposed outer route through the Sunderbans.

13.5. Tolly's Nallah was excavated towards the second half of the 18th century by Major Tolly to accommodate boats of 400 maunds and extends for a distance of $17\frac{1}{2}$ miles from the vicinity of Kidderpore dock on the Hooghly and is a navigation-cum-drainage channel. It used to form a useful connecting link between the Bidhadari and the Hooghly but since the rapid deterioration of the Bidhadari which is now dead and the siltation of this canal, it is navigable for a short distance only but serves a useful purpose in promoting sanitation, drainage and to a limited extent navigation of urban and rural areas.

13.6. The Midnapore canal connecting Midnapore with Uluberia on the Hooghly is 72 miles long and played a very important role after it was constructed at the end of the 19th century. The railways have been instrumental in the canal losing its importance. The Canal crosses three rivers and the river crossings, particularly the Damodar, are very shallow. The stretch of the canal between the Rupnarain and the Damodar has been permanently closed to navigation and there appears to be no prospect of its revival while traffic on the stretch between the Damodar and Uluberia on the Hooghly is fast declining; the total tonnage handled having dwindled from 39,000 tons in 1952-53 to about 9,000 tons in 1955-56.

13.7. The Orissa Coast Canal commences from Geonkhali on the Hooghly and was opened in 1880 to serve as a navigation connection. It is known as the Hijli Tidal Canal between the Hooghly and the Rasulpur rivers and as the Orissa Coast Canal south of the Rasulpur river and has a total length of $55\frac{1}{2}$ miles in West Bengal. With the advent of railways, the canal lost its importance although the canal still handles a fair amount of traffic. The Hijli Tidal Canal is particularly active, the traffic handled in 1955-56 having increased to 46,975 tons from about 19,000 tons in 1952-53. We observed that the lock gates at the tail end are badly leaking and in need of repairs and the siltation from the feeder channel to the tail end of the lock is presenting a problem for country craft at low tide. The toll charge between Geonkhali and Subarnarekha Ranges I to III (65 miles) is Rs. 4.75 for 100 maunds which, in the poor state of canal, is excessive. All the above canals are suffering from inadequate maintenance and consequential deterioration.

13.8. A new Canal known as the Damodar Valley Corporation Navigation Canal is nearing completion. It is primarily an irrigation canal but advantage has been taken to provide ancillary works to utilise the canal for navigation also at a cost of over Rs. 4 crores. The canal takes off from the headworks at Durgapur and meets the river Kunti about a mile upstream of its outfall into the Hooghly river near Tribeni. The bed-width of the canal varies from 172 ft. at the head to 60 ft. at the tail end. The canal is being provided for a minimum depth of 9 ft. with an allowance of 1 ft. for siltation. As 48 T.C.—3.

the canal was designed to carry reduced discharge during winter and summer months, it became essential to locate cross regulators at close intervals to maintain minimum depths thus necessitating provision of as many as 22 locks of size 286 ft. x 20 ft. in a length of 85 miles. This is an inherent disadvantage in the canal which increases the turn-round time of craft. The sides of the canal are not lined and speed restrictions are essential. Provision has not been made for continuous tow-paths to facilitate shore traction by mechanical mules and it will be necessary to tie up a number of small tugs in the canal for traction of barges between the locks.

13.9. With the development of the Damodar Valley Corporation new Irrigation-cum-Navigation Canal improvement of the stretch of the Hooghly between Tribeni and Calcutta is necessary. The Commissioners for the Port of Calcutta are undertaking periodic hydrographic surveys of the bars in this stretch. Adequate navigational aids will have to be provided and even dredging may have to be carried out as traffic develops.

13.10. The Damodar Valley Corporation Canal, notwithstanding its limitations, serves a highly industrialised area and measures such as toll free operation on the canal should be introduced for a specific period initially to attract boating interests. This canal is suited for encouraging development of country boat traffic which can be run by a cooperative organisation who could also provide small tugs.

13.11. Adequate repairs to locks at the tail end of the Hijli Tidal Canal should be carried out and the canal should be better maintained having regard to lack of other communications. This canal should be improved in conjunction with the stretch of the canal in Orissa.

13.12. An immediate hydrographic survey should be carried out between the channel creek and the Thakuran river on the basis of which plans for dredging the existing channels and developing more favourable cuts and connecting links between the main rivers and channels could be made with a view to improving the navigable route through the Sunderbans. For this purpose a sea-worthy survey launch and a dredger are necessary.

13.13. A suitable launch should be acquired for the use of Customs and Police at Behari Khal at the Indo-Pakistan border in Sunderbans for meeting in-coming and out-going I.W.T. craft for Customs and Police formalities without undue detentions to them.

13.14. The Port of Calcutta is ideally suited for full utilisation of inland water transport. With the expected increase in traffic through the Port by the end of the next Plan period and the proposed establishment of a subsidiary Port in the estuary, expansion in the activities of inland water transport are inevitable. The following improvements are essential:—

- (a) Provision of improved terminal facilities for operators berthing between patharia Ghat and Golabari Ghat.
- (b) Provision of a non-tidal berth in King George Dock.

- (c) Release of No. 3 berth King George Dock, for tea.
- (d) Provision of facilities including Customs formalities for loading and off-loading from ships into lighters and barges to assist in rapid transit of cargo to the hinterland.

13.15. A boat basin for craft originating from Durgapur could be developed in Chitpur canal near Lansdowne Jute Mill where craft bringing in building materials and coke for domestic consumption as well as I.W.T. flats mainly bringing down jute from Assam, could be sheltered from strong bore tides and other tidal problems of the Hooghly. For this purpose, improvements of the following, after detailed investigations, should be planned:—

- (a) The Chitpur Canal between its outfall into the Hooghly and upstream of Lansdowne Jute Mill.
- (b) The Chitpur Lock.
- (c) The lift bridge of Port Railway which has inadequate head room.

Uttar Pradesh and Bihar:

14. The most important waterway passing through the States of Uttar Pradesh and Bihar is the river Ganga. As it emerges out of the hilly region at Hardwar, the Ganga is a fair sized river. The upper Ganga takes off at this point and the diminished river flows down to Narora 143 miles lower down, where the lower Ganga Canal further depletes the Ganga discharge. In between this point and Allahabad the river is supplemented by the waters of the Ramganga. At Allahabad the Ganga and the Yamuna join, and it is from here onward that the river has possibilities from the point of view of inland water transport. About 35 miles upstream of Patna, the Ganga is joined by the Ghagra, its largest and most important navigable tributary. The Ganga receives on the south bank the Sone, about 10 miles upstream of Patna. Opposite the point of confluence of the Gandak with the Ganga, is situated Patna, the capital of Bihar. From here to the point of the off-take of the Bhagirathi, the most westerly of the three Nadia distributaries, the river flows in a solid stream unsupplemented by any large tributary except the Kosi, which joins it shortly before it turns south past the Rajmahal hills. The Bhagirathi—Hooghly was the main arm of the Ganga till the 15th century. Due to avulsion, the Ganga shifted its course towards the east and joined the Brahmaputra at Goalundo. The last stage of the river is in the delta area where it spills into various distributary streams before falling into the sea. The Ganga has a total length of about 1,600 miles via the Hooghly and the Bhagirathi and a catchment area of about 3,50,000 Sq. miles. The Ganga, like the Brahmaputra, is subject to considerable fluctuations in discharge and water level, the difference in water levels in the two seasons being over 40 ft.

14.1. The traffic on the Yamuna was formerly of some importance. Before the opening of the East Indian Railway, much cotton grown in Bundelkhand was sent down the river from Kalpi. Navigation on the Yamuna is at present confined to a stretch of about 40 miles above its confluence with the Ganga at Allahabad.

14.2. Being snow-fed, the Ghagra has adequate dry weather discharge and has considerable navigation potential. Steamers used to ply as far as Ayodhya some 40 years back and till the time of partition a daily service was operating up to Burhaj, a distance of 210 and 90 miles respectively from the confluence of the river with the Ganga. A steamer service used to run from Patna to Burhaj till the termination of steamer services by the Joint Steamer Companies on 1st January, 1958. Regular trade by country boats exists as far as Kartanian Ghat near Nepal border.

14.3. The Sone rises in the Central Indian Plateau and after flowing through the States of Madhya Pradesh and Uttar Pradesh enters Bihar where it joins the Ganga about 25 miles upstream of Patna. The total course of the river is about 500 miles. At its lower reaches, the river is generally very wide. During most of the year, the river carries only meagre discharge but it is frequently in heavy floods during monsoon when it is navigable by big country boats upto Dehri-on-Sone.

14.4. The Gandak joins the Ganga opposite Patna. There is considerable country boat traffic on this river and boats of 10 to 40 tons capacity ply upto Tribeni Ghat near the Indo-Nepal border. There is a proposal to construct a barrage on this river and divert water for irrigation during the dry season. This is likely to adversely affect navigation on this river.

14.5. The Kosi river is well known for its vagaries. It is navigable by big country boats from its confluence with the Ganga to Hanuman-nagar, a distance of 415 miles and by small boats upto Chatra in Nepal a further distance of about 35 miles, from which place large quantity of stone is transported down the river to Hanuman-nagar, where the Kosi Barrage is under construction.

14.6. The Upper Ganga Canal was constructed in the middle of the last century as an irrigation-cum-navigation canal. It was navigable throughout its entire length of 213 miles till 1933-34 since when this mileage has gradually decreased, particularly after the construction of power-houses blocking the canal. According to the latest information, it is navigable only for about 4 miles from its off-take.

14.7. The Lower Ganga Canal takes off from Narora and is 130 miles long. This was also designed for navigation throughout but at present country boats ply between the Headworks and mile 35, and from mile 70 to mile 130.

14.8. The Sone canal system takes off from the Dehri-on-Sone weir on the river Sone. It comprises (a) the Main Western Canal; (b) the Main Eastern Canal; (c) Patna Canal; (d) Arrah Canal and (e) Buxar Canal. The main Western Canal is navigable throughout the year by country boats in its entire stretch of 12 miles while on the Eastern Canal country boats can ply only in the first $4\frac{1}{2}$ miles. The Patna Canal takes off from the main Eastern Canal and tails into the Ganga. Country boats ply in its entire length of 79 miles, whereas small steamers ply between 16th and 78th miles only. The Arrah Canal takes off from the Main Western Canal and is 63 miles long. Small steamers ply for $52\frac{1}{2}$ miles while country boats navigate throughout the length. The Buxar Canal takes off from 12th mile of the Main Western Canal and tails into the Ganga near Buxar. Country boats ply in its entire length of 44 miles.

14.9. In the past inland craft used to ply up as far as Garhmukteshwar on the Ganga and Agra on the Jamuna. There has since been considerable decline in the activities of inland water transport both in Uttar Pradesh and Bihar. The withdrawals of water in the upper Ganga restricted navigation upto Allahabad only and development of railways on both banks of the river was responsible for further decline of water transport owing to the speed and the inherent advantage of shorter mileage by rail. The possibilities of development of water transport upstream of Allahabad to connect the important industrial town of Kanpur are remote. The partition of the country has dealt a severe blow to inland water transport on the Ganga. Prior to partition, the I.W.T. operators maintained water transport through the Ganga making Goalando the transshipment point for craft plying on the Ganga and the Brahmaputra. With the movement of traffic between Calcutta and Upper India being of a triangular nature; viz., Bihar to Assam via East Pakistan, Assam to Calcutta and Calcutta to Bihar, this arrangement of transshipment at Goalando was highly suitable notwithstanding the circuitous route to Calcutta. With the partition of the country and the decline of trade with East Pakistan, the steamer companies have now completely closed down their services through the Ganga. The only powered steamer services, now operating on the Ganga after January, 1958, are (a) the Railway ferry services between Sakrigali and Manihari Ghats, between Samaria and Mokemmah Ghats, between Paleza and Mahendru Ghats, between Paleza and Digha Ghats and (b) service maintained by the railway ferry contractor at Monghyr operating between Monghyr and Monghyr Ghats.

14.10. The river Ganga is navigable from Patna downstream throughout the year with a minimum draft in the dry season varying between 4 and 5 ft. Between Patna and Allahabad, a draft of 4 ft. is available in the flood season but this is gradually reduced to 3 ft. in December, with further reductions by April and May, especially near Allahabad.

14.11. All important industries and industrial centres have been located away from the banks of the Ganga and planned mainly with the object of using rail and road communications. Lack of location of major industries on the banks of the river has been a serious handicap to the development of inland water transport.

14.12. The most difficult and serious problem confronting the development of water transport on the Ganga system is bank erosion. While this problem is not so very serious during the period of rising river the worst phase of it occurs on the falling stage, particularly after the highest floods when the river levels fall within the limits of the main banks. At this stage there is continuous bank scour, when old loop channels get rapidly silted up and new channels and meanders develop. The bank erosion is at times so severe as to destroy all connections between rail-head ramps and ghat barges. It is necessary to constantly keep on sounding and marking newly developed channels and prepare plans for training the river by 'bandals' into the eventual dry season channels. The system of training the river by 'bandals' has been found very effective in rivers with sandy beds like the Ganga.

14.13. The main handicap that water transport on the Ganga has to contend with is the considerably longer and circuitous route through East Pakistan to the Port of Calcutta (except for two months in a year when the Bhagirathi route is open) as compared to direct rail route.

14.14. A decline in the activities of country basis is noticeable. The partition of the country whereby it is no longer possible for country craft to proceed from as far up as Burhaj on the Ghagra to as far down as Dacca in East Pakistan, is one of the major factors contributing to this decline. Another factor has been the monopolistic role of the ferry contractors operating at various Ghats who do not permit any other country boat to land at the Ghats without paying ghat charges.

14.15. It may be appreciate that nowhere in the world does inland water transport flourish without Governmental aid and interest. Conservancy measures such as bandalling and dredging should be carried out under the control of competent technical officers by the State Government. The Railways are running a number of ferry services on the Ganga and should therefore be interested in the conservancy and maintenance of the river. The conservancy measures should be aimed at providing a minimum economic draft for possible development of long distance traffic between Burhaj on the Ghagra in Uttar Pradesh and Rajmahal on the Ganga near the Bengal-Bihar border. In rivers like the Ganga and its tributaries with sandy beds, judicious bandalling is effective in improving channels, and closing loop channels. For maintaining adequate depths at Ghats etc. and for local improvements of shoals, dredging is necessary.

14.16. With the withdrawal of the steamer services by the Joint Steamer Companies, development of water transport service on the Ganga should be the responsibility of the State Governments concerned who should also provide facilities including approach roads and the maintenance of ghats. The State Governments should develop water transport organisations in conjunction with local boating and trading interests. The organisations in the two States should run country boat services towed by tugs which, with very little foreign exchange, could be constructed in the country. In Bihar, a service between North and South Bank is an essential requirement. The Pilot Projects of the Ganga Brahmaputra Water Transport Board viz., (a) towing country boats and (b) towing barges by shallow draft tugs; will provide valuable information on the relative economics of these two methods of operation.

14.17. The State Governments and the Government of India should take steps to divert adequate traffic for water transport services on the Ganga and Ghagra so as to encourage a co-ordinated rail-cum-river transport between the Port of Calcutta and Burhaj on the Ghagra in Upper India. There should be provision for through-booking facilities by rail-cum-river services between Upper India and Calcutta via Sakrighi Ghat or Rajmahal.

14.18. The immediate objective should be to make the Ganga a perennial waterway for a 6 Ft. draft. All multi-purpose projects that will assist in fulfilment of this should be encouraged. Further improvements will only be possible after the construction of retention

dams on all the feeder rivers which will not only cut off peak discharges and thereby reduce floods but also ensure adequate dry weather discharge.

14.19. Industrialists should be encouraged to locate industries on the banks of the rivers in regions where both rail and road connections are also available. It should be possible to select reasonably suitable sites and stability could be further ensured by adequate bank protective measures.

Orissa:

15. The State of Orissa is, at present poorly served by Railways. The main line of the south-eastern railway passes through Cuttack between the coast and the vast hinterland. The National Highway also runs parallel and close to it in a North-Easterly, South-Westerly direction, while the major inland waterways of Orissa run through the State from roughly west to east across the main highway and railway lines. In the deltaic regions, such as the areas served by the Kendrapara and Taldanda Canals and the Orissa Coast Canal and the hinterland, west of the railway line between Cuttack and Dholpur on the Mahanadi, inland water transport is the main means of communication. We are greatly impressed with the potentialities of water transport in the deltaic region whose development is intimately connected with the future development of Paradip Port which has recently been declared a minor Port. These waterways serve a region completely devoid of rail communication and where road communication is not adequate. The necessity of a co-ordinated development of these waterways in this region has impressed us greatly. While water transport in Orissa cannot be fully developed without an outlet to the sea through Paradip Port, the development of a Port itself is dependent, entirely on the amount of traffic fed into it and taken out of it and this, as it stands, can only be effected by inland water transport. The two schemes are, therefore, inter-dependent and should be developed simultaneously.

15.1. Orissa State is endowed with forest and vast natural resources such as iron ore. The mineral deposits found in the hills bordering the Mahanadi and the Brahmini rivers in the vicinity of Sukinda form a large potential for earning foreign exchange provided the minerals can be transported cheaply from the mines for export through the proposed Port. As Sukinda area is about 20 miles upstream of the head of the High Level Canal Range I at Jenapur, inland water transport appears to be ideally suited for this purpose.

15.2. The Mahanadi river has a total length of about 300 miles in Orissa. Navigation has always been active on this river. On the basis of the condition of the river it can be divided roughly into three portions:—

- (a) The rocky reach from Sambalpur to Dholpur, a distance of 95 miles is full of rock eruptions and rapids.
- (b) The sandy reach from Dholpur to Cuttack, which is about 100 miles.
- (c) Delta reach from Cuttack to sea, a distance of about 65 miles where the river spills into numerous channels.

There is regular navigation in these reaches by country boats throughout the year. Below Cuttack, navigation is carried on the Delta Canal system. The construction of the Hirakud Dam has made available a regulated discharge of about 8,000 cusecs, which will help in improving navigation. A group of French engineers (known as the French Mission) visited the Mahanadi in 1951, to advise on the navigational aspect of the river. They suggested the improvement of navigation by introduction of power craft on the Mahanadi by stages. The proposal in its ultimate stage included the training of the rocky and sandy reach of the Mahanadi river. So far no action has been taken on the recommendations of the French Mission.

15.3. The Kendrapara, the Taldanda and the High Level Canals connect Cuttack with the Paradip Port and serve the needs of both navigation and irrigation and bear eloquent testimony to the foresight of the planners of the last century. The Kendrapara Canal takes off from the pool upstream of the Birupa anicut and it has its outfall into the Jambo river at a point 10 miles from Paradip Port. Navigation is provided on this canal system with a view to link Cuttack with Chandbali as also with the False Point Harbour. This is the ildest and the most important canal in Orissa. It was designed to give a depth at 7 ft. at its full supply but has deteriorated due to neglect and the depth of water now available is only about 4 ft. at full supply level in its lower reaches. There are 8 locks in this canal, the minimum dimension being 100 ft. X 17 ft. In the past, when there was no rail communication in Orissa, the Kendrapara Canal was the principal artery of the State and there was a regular bi-weekly service of steamers from Cuttack to Chandbali Port via the Kendrapara Canal, Gobri Canal and the Brahmini and Baitarani rivers. This service used to connect up with the regular boat service to Calcutta through the Matai Nallah and the Orissa Coast Canal but with the opening of the East Coast Railway and consequent loss of the importance of the Orissa Coast Canal, this service was abandoned. With the increased area brought under jute cultivation after the partition of the country, this canal has again started figuring as an important line of transport.

15.4. The Taldanda Canal takes off from the right bank of the Mahanadi river near Cuttack town from the pool formed by and immediately above the Mahanadi anicut. It has its outfall into the Mahanadi river about 9 miles from the Paradip Port. It has 7 locks. The dimensions of the head lock are 150 ft. x 20 ft. while the rest are 105 ft. x 17 ft. At Birbatti it bifurcates into two canals, the Machgaon Canal taking off at this point. The Taldanda Canal narrows down in its lower reaches and the depth is also considerably reduced.

15.5. The High Level Canal Range I runs from its off-take off Birupa river to its out-fall into the Brahmini at Jenapur, a distance of 33 miles. After the abandonment of the Brahmini anicut on the advice of the Flood Enquiry Committee of 1927, the river has become completely dry during the dry season and consequently the out-fall to the canal has been blocked. There are three locks in the canal. the minimum dimensions being 150 ft. x 20 ft. The canal was originally designed for a depth of 6 ft., but has silted considerably especially in the last few miles.

15.6. Water transport is the chief mode of communication in the deltaic districts of Cuttack, Balasore and Puri. Country boats are used in the estuaries of the Mahanadi, Brahmini and Devi rivers. Nature has endowed this region with a net work of navigable waterways and connecting cross channels comparable to Sunderbans region of Bengal. Through navigation, at present is possible between Charbatia (in Balasore) and Paradip Port via the Matai, Baitarani, Brahmini, Hansua and thence by creeks to the Mahanadi estuary.

15.7. The Orissa Coast Canal which once connected the waterways of Orissa with the river Hooghly at Geonkhali and was an important link between Bengal and Orissa, was abandoned in 1928 on the recommendation of the Flood Advisory Committee to facilitate drainage of upland water during the monsoon months. Although this canal has been abandoned, there is some traffic between the Subarnarekha and Burabalong rivers and navigation by small country boats is still continuing at high tides but the stretch between the Burabalong river and Matai Nallah, a distance of $37\frac{1}{2}$ miles is totally closed for navigation.

15.8. A traffic survey under the direction of the State Government was recently carried out by a retired Railway Officer. He has come to the following conclusions:—

- (a) It is necessary to develop inland water transport along with Paradip Port.
- (b) Road and canal systems will be complementary and supplementary to Railways in certain areas.
- (c) Delta canals should be improved.
- (d) A Water Transport Corporation should be set up on co-operative basis with through booking arrangements with Railways.
- (e) It is necessary to develop a shipyard at Paradip.

15.9. The programme of development of the waterways of Orissa is intimately connected with the plans for the development of Paradip Port. Till this Port is fully developed, cargo can be handled during fair-weather by lighters which can cross the Mahanadi mouth and contact ships anchoring in the deep sea. The minor port of Chandbali can only cater for ships upto 400 tons capacity. Paradip has been declared as a minor port and is already being used for export of iron ore. We recommend that the following measures be taken for the improvement of these waterways.

15.10. The High Level Canal Range I and the Kendrapara Canal should be improved to a minimum bed-width of 60 Ft. and a depth of 7 ft. at normal water level and brick or stone lining of the sides of the canal should be undertaken as traffic develops to enable power craft to operate on these canals. The navigability of the Mahanadi between Dholpur and Cuttack should be improved on the basis of hydrographic surveys which we had recommended.

15.11. The waterways connecting the Port of Chandbali through the tidal portion of the Gobri Extension Canal and the Brahmini and the Baitarani rivers should be improved. For this purpose suitable

dredgers should be acquired and the dredging programme planned on the results of the hydrographic surveys. Dredging is also necessary to keep the channels upstream of the Birpura anicut clear during the low water season and to maintain adequate depths off the off-takes of the channels.

15.12. Provision of railway connection from the Ore mines at Sukinda to the head of the High Level Canal at Jenapur or an all weather road connection with a bridge over the Brahmini.

15.13. The tolls at present charged over Orissa Canals are excessive and tend to make water transport unattractive. These should be considerably reduced to the barest minimum possible so as to encourage inland water transport.

15.14. The Taldanda Canal should also be similarly developed and extended to Paradip Port. The existing locks over all the three canals are too narrow and new locks should be constructed to the dimension of 250 ft. \times 30 ft., to enable inland water transport to be developed to full capacity to transport the optimum quantity of iron ore. There are a number of bridges on the High Level Canal Range I as well as the Kendrapara Canal which have inadequate clearance between spans. These bridges should have two spans of 30 ft. and 60 ft., each and should provide for at least 16 ft., clearance above the high water level. It is expected that after improvements, it would be possible to lift one million tons per annum.

15.15. With the completion of the Hirakud Dam, adequate water supply is available and it may be possible to make the river Mahanadi navigable from Dholpur to Cuttack. From Cuttack there is a net-work of navigable canals and tidal waters connecting Paradip Port. The Mahanadi thus offers excellent opportunities for location of industries on its banks.

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CHAPTER V

WATERWAYS OF THE REST OF INDIA—THEIR PROBLEMS AND SUGGESTIONS FOR IMPROVEMENT

Madras-Buckingham Canal

16. The Buckingham Canal, connecting the State of Madras with the delta canals of the Godavari and Krishna rivers of Andhra Pradesh, is one of the longest canals in the world. Its total length is 262 miles of which 160 miles lie in Andhra Pradesh and the remaining 102 miles in Madras State. It was first constructed as a canal only a few miles in length by a private individual in 1806 at a time when other modes of transport were non-existent. Thereafter, by the end of the last century, it extended from the backwaters of Marakkanam, 66 miles south of Madras, to the Commamur fresh water canal of the Krishna Delta, 196 miles north of Madras. With the inter-connected system of waterways of the Krishna and Godavari Deltas, it provided a valuable navigation route of over 400 miles between the port of Kakinada and the southern limit of the Canal. With the subsequent development of railways from the beginning of this century, important towns and trading centres developed along the railway lines and as a result water transport through the canal suffered considerably.

16.1 Considerable concern and agitation over the neglected state of the canal and falling off of the volume of traffic over the canal was expressed in the Legislatures from time to time, but nothing was done to improve the canal. During the Second World War, when acute shortage of rail and road transport was felt, some attention was paid to keep the canal in better condition. The canal played a vital role in solving the transport problems. At the end of the war, several schemes were drawn up for improving and linking this canal with Vedaranyam canal but none of these was implemented.

16.2 The canal running, as it does, parallel to the sea coast, at a distance of about a mile, has to cross a number of rivers. These river crossings (19 in number) with the exception of Kandaleru river which has a wide and deep crossing, present serious problems particularly in the dry season, when they can be negotiated only at high tide. In the absence of dredgers, manual excavation is resorted to wherever possible though it is slow, prolonged and inefficient. The Pennar river crossing is the most troublesome and over 700,000 c. ft. of silt is cleared annually in an endeavour to maintain depths in the dry season at high tide. Suitable regulating works, such as flood gates and lock gates, have been provided in the canal in the vicinity of river crossings to keep out the river flood during the monsoon season and to admit tidal inflow at high tides and to maintain the canal at a constant level of plus 21.00 ft. (mean sea level

being plus 20·00 ft.). There are 21 locks in the north canal and 7 in the south canal. These locks have a uniform width of 20 ft. and a clear length of 150 ft. The canal bed level has been designed to plus 16 ft., but owing to siltation the bed in several reaches was found to be much higher. A draft of 3 ft. is permissible in North Buckingham Canal and 2 ft. in the South Buckingham Canal.

16.3 The main commodities transported on the canal are fire-wood, shells, salt and other miscellaneous goods. A peak figure of 4·86 lakh tons was handled during the year 1943-44 when rail transport facilities were inadequate to handle the heavy demands made during war years. There has been a decline in traffic since then. A slight improvement has, however, been noticed since 1955-56 as indicated by the following figures furnished by the two State Governments:—

Year	Total traffic handled
	(lakh tons)
1938—39	2·3
1943—44	4·8
1952—53	2·16
1953—54	1·21
1955—56	1·83
1956—57	2·71
1957—58	2·87

16.4 During the course of our inspection of the canal we found the depths inadequate at most river crossings and the approach channels to the canal locks. Even in some of the closed reaches of the canal such as the stretch between Kothapatnam and Mudigundi rivers (in Andhra Pradesh), the canal was very narrow and depths of 2½ ft. and 3 ft. were obtained with the canal level at plus 21·7 ft. We were informed that this was a problem reach particularly between miles 179 and 181 where both the banks are low and considerable quantities of fine clay are blown into the canal from the surrounding areas causing siltation. The maintenance costs amount to over Rs. 7,000 per mile as compared to the normal cost of Rs. 2,000 per mile in other closed reaches of the canal.

16.5 In the Madras city limits, the canal presents a poor sight with the sewage and storm water discharging into it. The canal runs from North to South through the heart of the city into the Cooum South Channel and the junction canal between the Cooum and Adayar rivers. The Cooum river forms the drainage channel for the central and western portions of the city. As its outlet to sea is locked for major portion of the year, it is, at present, a stinking and

stagnating pool of water. Slums had sprung up on the banks of the Junction Canal between the Cooum and Adayar rivers. The canal water is polluted by storm water outlets and overflow from the corporation sullage drains.

16.6 Adequate flushing of the Cooum river and the Buckingham Canal either through the boat basin or through the port is not possible owing to unfavourable water levels. Continuous removal of sand from the mouth of the Cooum appears to be a possible way of keeping it open to tidal action perennially so as to enable the stagnant and contaminated water being drained into the sea. The possible repercussions of any such measure on the Port area due to the Northerly littoral current will however have to be considered as also the capital outlay to the extent of about Rupees One crore for the purchase of a sand pump and the construction of a pier, etc., in addition to the recurring expenditure of Rs. 5 lakhs per annum.

16.7 There are a number of rail and road bridges across the canal. Some of these bridges especially the Park Station Railway Bridge near the Penitentiary and the Railway Plate Girder Bridge at Elephant Gate, appear to have been constructed without considering future developments of the canal. While the Park Station Railway Bridge has a width of 20 ft. between spans, it provides head clearance of 5 feet 6 inches only at the maximum water level of plus 2.35 ft. The Railway Plate Girder Bridge (Skew Bridge) has a normal span width of 16 feet 6 inches except at the two ends but as there is a projection of the pier caps on either side, the net clear width available is only 13 feet 10 inches while the head-clearance is only 4 feet 6 inches below the maximum water level of plus 25.5 feet. (We were informed that the total number of days when the water level is in excess of plus 22 ft. is about 16 days).

16.8 While it may be possible to increase the minimum existing width of 13 feet 10 inches available under the Railway Plate Girder Bridge at Elephant Gate by removing one row of screw piles and providing additional piles to strengthen the bridges, the provision of even a minimum head clearance of 10 ft. under this bridge and Park Station Railway Bridge poses a difficult problem. The area is such that it is not possible to raise the bridges so as to get this room. The possibility of conversion of these two bridges into lift bridges was considered but we feel that as the entire railway traffic to Waltair, Bangalore and West Coast passes over the Elephant Gate Bridge and there is a continuous movement of Suburban electric train services over the Park Station Railway Bridge, this will not be a practicable proposition. Making the Cooum river perennially tidal might result in the head room being slightly increased under the two bridges, at the reduced water level at low water each day. Another solution to the problem of getting over the difficulty of the head-room of the bridges is to provide a lock with pumping arrangements but this is likely to be an equally expensive proposition. At the present moment only about 4 boats pass each day through the junction canal between Madras wharf and the southern portions of the city. From the existing traffic, we are not convinced that benefits from increasing the head room would be commensurate with the expenditure involved in providing locks and pumping arrangements.

16.9 Although this canal passes close to the port of Madras, it has no connection with the harbour. Various proposals had been made since 1895 to establish a connecting link between the canal and the harbour. It was found impracticable to provide this connecting link north of the city due to rapid development of the area. A direct link canal to the harbour basin from the Cooum river is not possible owing to the presence of Railway lines, Marshalling Yards, coal and ore stacking berths and the expansion programme of the Port authorities southwards to cater for a traffic of 5 million tons. The pattern of traffic has also been such that the quantum of cargo moving north of Madras has been negligible while the bulk of incoming traffic consisting of shells, rice, firewood and salt does not enter the Port.

16.10 The principal wharves in the city are the Madras wharf and Hood wharf. Here cargo from country boats is loaded into lorries and hand carts for distribution in the city. Terminal facilities such as transit sheds or warehouses are not provided at these important wharves which are not even fully enclosed with compound walls to ensure the security of goods.

16.11 Although boats upto 30-ton capacity with a maximum draft of 3 ft. are allowed to ply on the North Canal, the shoal conditions in certain stretches impose draft restrictions and boats can seldom go loaded to full capacity. In addition to transport of commodities, the canal also provides transport facilities for passengers living in the marginal villages. There are about 1,300 country boats plying in the canal which are built locally of teak by individual owners, the maximum size being length 77 ft. beam 11 ft. and draft 3 ft. with low head clearance to pass under the bridges. The transport over the canal is primitive, there being no documents or receipts issued for the cargo transported. This sometimes results in pilferage and discourages expensive commodities like mica being transported by the canal. There is no fixed freight structure, the cost of transport of any commodity varying according to supply and demand. The canal also suffers from the disadvantages of not having adequate road connections to important rail heads and towns. There are hardly any regular two paths along the banks of the canals and the problem of obtaining adequate supplies of fresh water along the banks of the canals in certain stretches is acute.

16.12 The Vedaranyam Canal takes off from Kudavayyar river near the Nagapattanam Port and connects the Vedaranyam town, a large salt manufacturing centre with the Port of Nagapattanam. The canal has silted up in a number of reaches and the construction of the railway line has deprived the canal of its importance. The canal was completed with the main object of serving the transport needs for commodities like salt, fuel, rice, etc. A number of straight drainage cuts and tidal inlets have been developed to facilitate free discharge of delta floods. There is one lock at Karungani which was constructed with the main purpose of preventing irrigated lands below the lock being washed away when the canal is in high floods. With the development of drainage cuts, the lock has become redundant and the gates are permanently kept raised, except for brief periods in summer month when the upper gate is closed and drainage water is diverted towards Nagapattanam Port. At present,

about 110 licensed boats ply in the canal carrying about 7,000 tons of cargo. According to local representatives 1,000 boats used to ply on this canal in former times but the deterioration of the canal in recent years has resulted in decrease in the number of boats. During the war years, it was proposed to extend the South Buckingham Canal and connect it with the Vedaranyam Canal to provide a direct communication from Kakinada to point Calimere. This proposal which was then estimated to cost Rs. 13.7 lakhs was, however, abandoned as the cost was considered prohibitive by the State Government. A fresh estimate of Rs. 50 lakhs was again prepared. This proposal was again revived by the Central Water and Power Commission as a part of the Master Plan to extend waterway connection between Calcutta and Mangalore via Cape Comorin and a rough estimate of Rs. 125 lakhs had been prepared. The canal is expected to pass through Cuddalore but owing to the non-availability of adequate water and the difficulties of topography, it is not possible to have a link canal between Cuddalore and Neivelli where the integrated lignite project is now in the construction stage. The traffic survey of the area recently carried out, which took into consideration the anticipated output of Neivelli Project when it goes into full production, has revealed that there is no justification for either improving the Buckingham and Vedaranyam Canals or for connecting these two canals.

16.13. A sum of Rs. 115 lakhs had originally been provided in the Second Five Year Plan for effecting improvements to the Buckingham Canal but the improvements that are necessary to make this into a fit and modern waterway would cost many times this amount as dredgers will have to be provided to maintain each of the river crossing. The existing traffic potential is low. The lack of foresight shown in not providing adequate head-room under the two railway bridges will now preclude any major improvements to the canal to facilitate bulk movements in big barges. We had suggested that experimental dredging to a depth of 6 ft. should immediately be carried out by Madras and Andhra Pradesh Governments in vulnerable reaches to see that the canal bed when deepened would not heave up again almost immediately to its pre-dredged level as was reported earlier. The result of this experiment have not been intimated to us. Nevertheless, we feel that the canal should be maintained to a minimum depth of 5 ft. (making allowance for siltation) so as to facilitate country boats with 3 ft. draft to operate fully loaded. River crossings should also be adequately deepened to reduce unnecessary detention of boats. This should be carried out by acquiring cutter suction dredgers. The manual excavation that is now being carried out is totally inadequate and unsatisfactory. Provision should be made for effecting improvements such as:—

- (a) Approach roads to important roads and towns.
- (b) Adequate supply of fresh water at all locks along the banks of the canals.
- (c) Good tow paths along the banks of the canal and protection against robberies.
- (d) Measures to minimise pilferage and encourage expensive items like mica being transported by waterways.

- (e) Introduction of fixed freight rates.
- (f) Adequate terminal facilities such as transit sheds and warehouses. This will obviate the present unnecessary detention of country boats at Madras and Hood wharves for recovery of demurrage on goods till they are cleared from the wharves by the consignee.

16.14. We do not see much justification for major improvements involving considerable capital expenditure to the Vedaranyam Canal beyond the normal maintenance necessary to counteract siltation. The canal has one inherent advantage in that it has its outfall into the Port of Nagapattanam. We, therefore, suggest that one dredger be provided to maintain the canal and every encouragement be given for the transport of salt from Vedaranyam town to Nagapattanam for shipment to the port of Calcutta.

Andhra Pradesh:

17. The Krishna and Godavari Delta Canals are primarily irrigation canals but are closed for about a month when water supply level is low. Nevertheless, they form vital lines of communication connecting the Kakinada and Muslipatnam Ports with the important industrial town of Vijayawada. Water transport has been well developed although it is entirely confined to slow moving country boats. The Ellore Canal connecting Vijayawada with the Kakinada Port is the most important, the quantum of traffic handled being about 3,50,000 tons; iron ore for export through the Kakinada Port forming the bulk. The Muslipatnam Canal, connecting the Port of Muslipatnam with Vijayawada, is another important canal and cargo to the extent of 2,50,000 tons (mostly iron ore) passes through this canal.

17.1. A striking feature of the region served by these two canals is that although all three modes of transport, viz., rail, road and canals, run close to each other, they are complementary and not competitive. Ore is transported to the ports by co-ordinated movement of rail, road and water transport. The canals by virtue of their connecting important towns and trading centres and the minor ports of Muslipatnam and Kakinada, play an important role in the transport system of the region.

17.2. The Commamore Canal connects the Buckingham Canal with the waterways of the Krishna-Godavari Delta and forms a very useful link. The Kakinada Canal is another important canal. There are numerous other canals such as Ryves Canal, Nizamapatnam Canal and West Bank Canals of the Western Delta Canal system and the Gostandi, Velur and Narasapur canals of the Godavari canal delta system. The entire area of the Krishna Godavari Delta is covered by a net-work of easy communications and water transport in this region is flourishing.

17.3. Several industrial concerns have sprung up close to the Krishna Delta Canal system, which could utilise water transport for bulk movement of commodities after necessary improvements. The Vuyyur Sugar Factory, about 22 miles from Vijayawada, the nearest broad gauge junction, is situated on the bank of the Pulleru Canal

branching off from the Muslipatnam Canal. This canal could be utilised for meeting the transport requirements of this factory if locks are provided at suitable places.

17.4. The limitations of the canals are as follows:—

- (a) Being primarily irrigation canals, the interest of irrigation comes before any other consideration such as navigation. The water supply level is reduced in the summer months and the canals are closed for more than a month.
- (b) The available depth in the canals is limited to about 3½ ft. and boats have to navigate the canals partly loaded.
- (c) The tonnage of craft navigating these canals is not permitted to exceed 40 tons.
- (d) No powered craft is permitted on the canals.
- (e) While the locks in Commamur and Buckingham Canals, Ellore and Muslipatnam Canals, are 20 ft. wide; the two locks on either side of the Krishna river are only 15 ft. wide and require to be widened as traffic develops.
- (f) The Cuddappa-Kurnool Canal has the disadvantage of not serving any important trading centre.

17.5. There are a number of rivers in Andhra Pradesh all debouching into the Bay of Bengal. Of these, the Krishna and the Godavari rivers are the most important. The Krishna river is navigable upto 22 miles throughout the year, and for 60 miles upstream of the anicut during the monsoon months. There are no important trading centres close to the river except Vijayawada. The Krishna runs midway between the two sections of the Southern Railway, viz., Vijayawada to Kazipet and Vijayawada to Guntakal. The Andhra Cement Factory at Vijayawada requires lime kankar to the extent of about 1,000 tons per day and if the Krishna river could be improved to make it navigable upto Chintapalli, 44 miles upstream, the transport problems of this important factory could be solved.

17.6. The Godavari river flows through regions rich in mineral wealth and forest produce and is navigable for about 116 miles upto Dummaguddam by craft drawing 3 to 4 ft. of water and for further 72 miles upto Chandrupatla by lighter craft upto the month of February. In the dry season between March and June, the river is navigable only upto Kannavaram, 90 miles upstream of Dowlai-shwaram anicut for vessels drawing 3 to 4 ft. of water. Powered boats are plying on this route. The Sabari river, which has its outfall into the Godavari at Kannavaram, and its branch the Sileru connect the Godavari with one of the richest deposits of iron ore in the country, i.e., the Balaidalla range, near Bastar, in Madhya Pradesh. The feasibility of making these rivers navigable for transporting iron ore has to be examined although reports indicate that the navigability of the river is confined to small craft upto February.

17.7. The branches of the Godavari below Dowlai-shwaram Anicut include the tidal arms of the river which are connected with deltaic canals by tail end locks. Of these the Gowthami Godavari is navigable from 23rd mile below the anicut to sea for a distance of 17 miles. while the Vasistha Godavari serves important markets in the delta

region where water transport is the only means of communication. The river is navigable from the 37th mile below the anicut to sea throughout the year for craft drawing 3 to 4 ft. of water. The Vynethayam river, a branch of the Vasistha Godavari is navigable for small craft only throughout the year.

17.8. The Kandaleru river, which is connected to the Buckingham Canal, has navigation potentialities. 30 ton boats can ply upto 18 miles upstream, i.e., within 8 miles from the National Highway Bridge near Gudur. Kandaleru can be developed into a minor port and an excellent fishing centre as it provides a deep and sheltered anchorage although the river is shallow at the sea bar with depths of 3 to 4 ft.

17.9. The two minor ports of Andhra Pradesh, viz., Kakinada and Muslipatnam, handle a fair quantum of iron ore traffic and are fortunate in having a net-work of canal systems leading to them. The Ellore Canal and Muslipatnam Canal leading to these two ports, notwithstanding their present position of being irrigation canals, are open to navigation for 9 months in the year and carry about 7 lakh tons of traffic (mostly iron ore). Improvement to the Delta Canals and waterways should be carried out to facilitate the transport of iron ore which is a vital foreign exchange earner. Probably the richest deposits in the country are situated in the Balaidalla range in Madhya Pradesh close to the Sabari and Sileru rivers which have their outfall into the Godavari river. We, therefore, suggest the following improvements.

17.10. The limitation under which country boats transporting iron ore through the Krishna and Godavari canals to the Ports of Muslipatnam and Kakinada operate, should be reduced. It is recognised that these canals are primarily irrigation canals and the withdrawal of water for irrigation purposes in the transplantation season is inevitable but now that the Krishna Barrage has been completed, it might be possible to obtain an additional 1 ft. depth of water in the Muslipatnam and Ellore Canals. The State Government should utilise this advantage in increasing the transport of ores through these Canals and the above aspect should be borne in mind in catering for the additional irrigation requirements. Although the canals are manually excavated during the short period that they are closed every year, dredging would considerably help in deepening the shoals.

17.11. Several industrial concerns which have sprung up close to the Krishna Delta Canal system could utilise water transport for bulk movement of their requirements if a few improvements are effected. Vuyyur Sugar Factory about 22 miles from Vijayawada, the nearest broad gauge junction, is situated on the Pulleru Canal branching off from the Muslipatnam Canal. We suggest that early steps be taken to construct suitable locks on this canal to cater for the transport requirements of the region.

17.12. The Andhra Cement Factory at Vijayawada requires about 1,000 tons of lime kankar per day which is available at Chintapalli, 44 miles upstream of the anicut of the Krishna river. At present, this river is navigable upto about 22 miles upstream of the anicut

in the dry season. In the absence of data such as hydrographic surveys, it has not been possible for us to assess the measures necessary to extend the navigability of this river. This should be undertaken immediately and schemes for improving the navigability of the river, taking into consideration the water management plans on completion of Nagarjunasagar Project, should be prepared.

17.13. The most essential long term requirement is the improvement of navigability of the Godavari river for bulk movement of ores. Detailed hydrographic and engineering surveys were not available to us but this scheme should be given priority, after completion of field investigations.

17.14. The question of lining the Ellore and Muslipatnam Canals and introduction of powered craft should also be considered as traffic develops and the problem of adequate water requirements for navigation has been examined.

17.15. Possibility of widening the two locks on either bank of the Krishna river to a minimum dimension of 150 ft. x 20 ft. should also be examined as traffic develops in the canals. This will make the entire canal system including the Buckingham Canal navigable for vessels of optimum size.

17.16. All the navigable canals in the State of Andhra Pradesh and Madras run length-wise in north and south direction. There is lack of navigable waterways running across the Peninsula in east and west direction where road and rail communications do not exist to the same extent. We suggest that the possibility of developing navigation as far up the Godavari and the Krishna rivers as possible be investigated.

17.17. The Kandaleru river which is connected to the Buckingham Canal has navigation potentialities. The development of Kandaleru into an important fishing centre and a minor port should be taken up and the extension of navigation along this river upto the mica mines in Gudur should be planned after detailed surveys.

Kerala:

18. The State of Kerala is traversed from east to west by 26 rivers of which 7 are important from the point of view of navigation. The existence of a number of lakes and backwaters all along the coast is a striking feature of this region. These vary in size and shape and run parallel to the sea coast receiving the drainage of rivers emptying into them. These backwaters with their subsidiary canals extend from as far north as Badagara to as far south as Trivendrum, a distance of 285 miles. With a large number of west flowing rivers, marshy submersible lands, lakes and backwaters along the coast line, the net work of waterways has always been the main means of communication in this State. From very early days the natural facilities provided by backwaters have been taken advantage of by constructing link canals. An extensive project to connect Cape Comorin with Mangalore was thought of many years ago and the Verkalla barrier was pierced by means of two tunnels now known as Verkalla tunnels and the connections were made between north and south canal

systems. The project of extending canal further south was abandoned due to high costs. In Kerala, the entire area along the backwaters and canals is heavily populated. We were impressed with the number of industries that have been sited close to the waterways connecting a number of minor ports and the major port of Cochin. It is because of these inherent advantages and absence of rail communications that waterways play a vital role as carriers of commodities. A description of the west coast waterway system and its problems is given below.

18.1. The Sultan Canal forms part of canal link between Azhikkal and Hosdrug and suffers from lack of adequate maintenance. The depths are shallow and inadequate. The Azhikkal Port situated at the mouth of the Vallaripatnam river at the tail end of this canal handles a traffic of about 30,000 tons. Sailing boats come right upto the wharves, the outer bar carrying a depth of 4 ft. at low water level. There is a gap of $29\frac{1}{2}$ miles between this canal and Badagara through which the proposed link canal has been aligned.

18.2. In the stretch between Badagara and Beypore there exists at Payoli a lock with dimension of 50 ft. x $12\frac{1}{2}$ ft. This lock is entirely unsuitable for future development of waterways. There are two minor ports in this stretch, viz., Calicut and Beypore. Both these together handle about 30,000 tons per annum. The Beypore river has its origin in the Nillambur forests and has vast potentialities for transporting timber and exporting it through Beypore and Calicut ports. But owing to inadequate depths, the timber cannot be floated down the river except for a short period. Beypore also possesses a boat-building yard where sea going sailing vessels are built.

18.3. The weak link in the section between Beypore and Cochin is the road bridge at Punani which has a head clearance of 6 ft. only at high tide and vallams or local country boats have to wait for low water before they can pass under the bridge. The capacity of most of the Vallams varies between 10 and 12 tons and their progress between Cochin and Punani is very slow because of inadequate depths. The low clearance under the Punani bridge also prevents dredgers being utilised to deepen this stretch. The Conolly Canal, which is the name given to the waterway in this area, is very narrow in certain places, the narrowest width being 15 ft. Between Punani and Chetwayi two mud dams are put up every year to hold up fresh water and to prevent the intrusion of saline water. Tolls are collected for passage of boats at these two dams.

18.4. Cochin is a major port in Kerala State and connected to the backwaters north and south. This Port handles about 2 million tons of cargo per year and is now being developed into an important naval base. The waterway communication between Cochin and Quilon passes through Vembanad Lake, the Pamba river, the Kayamkullam Lake and the Asthamudi Lake. The State Government plan to construct a barrier at Tannirmukkam on the Vembanad Lake to exclude the saline water in the dry season. It is proposed to construct three locks (one twin and one single) for inland craft to pass the Tannirmukkam barrier. The largest lock will be 150 ft. x 30 ft.

18.5. With the development of Cochin Port, Alleppey Port has lost its importance and now handles only about 20,000 tons annually as compared to 100,000 tons many years ago. At present there are about 125 powered passenger boats plying on 8 routes in Alleppey. As a result of the development of road and train services in this region, the revenue of these boats has been going down gradually. The Alleppey-Shertallai Canal, where excavation work was first commenced many years ago, has silted up. The State Government have given first priority for making this canal fit for navigation in their plans. At Thotapalli, there are twin locks of size 90 ft. x 18 ft. but only one lock is being operated causing considerable delays to water transport operators. At present over 50,000 tons of oil is transported annually between Cochin and Quilon and the oil companies expect this traffic to double itself in the course of the next 7 or 8 years. The shallow stretches between Iriyad and Quilon, where better depths could be maintained by dredging, necessitate frequent under-loading of barges. The State has a few dredgers which can be used to improve the conditions in this reach. There are several mineral factories on the banks of the canal north of Quilon for processing mineral sands such as Monozite, ilmenite etc. The West Coast Canal through Quilon is narrow and heavily congested. It is necessary to improve the terminal facilities at the Quilon wharf where considerable siltation has taken place. The canal banks are very steep and vertical toe-walls are collapsing and require immediate repairs.

18.6. There is no bulk movement of oil between Quilon and Trivandrum on account of inadequate depths and narrow width of tunnels at Verkalla. The overall length of the two tunnels is about 6 furlongs with a width of about 14 ft. The head room in the tunnel is inadequate for big barges. These tunnels are the bottlenecks for transport in this region and there appears to be no possibility of widening them. One-way traffic is maintained through these tunnels, the entire control of traffic being left to the boatmen. The canal in this area has silted up. The average depth is about 2 ft. and only country boats use this canal. South of Trivandrum the canal extends to another $6\frac{1}{2}$ miles. This stretch is also in a neglected state.

18.7. The Government of Kerala have proposed schemes costing about Rs. 965 lakhs for the improvement of the West Coast Canal from Trivandrum to Cochin and Cochin to Hosdrug and for the construction of a new canal link between Badagara and Azhikkal. While a very comprehensive review of the waterway had been prepared by the Kerala Government, a detailed engineering survey showing the extent of improvements necessary in each section has not been undertaken. During our inspections of Kerala waterways, we were greatly impressed with the fact that there is hardly any area without population along the backwaters and canals and a number of industries and factories are situated close to the waterways. A number of minor ports and the major port of Cochin are served by these waterways.

18.8. With the industrial development of the State, inland water transport has a good future provided measures are taken to improve and maintain the waterways. The most important stretch is between

Cochin and Quilon with considerable movement of products of coir industry, cashewnuts and oil. The poor state of maintenance of the waterways in certain stretches is a handicap for bulk movement. We, therefore, suggest that the following measures be adopted to improve the waterways:—

- (a) The State Government should take steps to ensure that both the locks at Thotapalli are operated.
- (b) Navigation aids such as lights fixed on mooring posts should be provided in the narrow stretches.
- (c) The dredgers available should be immediately employed to deepen the stretch between Irriyad and Quilon. This waterway should be improved to a minimum bed-width of 50 ft. wherever possible with a depth of 6 ft. at normal water level.
- (d) Dredging should be undertaken to improve the depths at the quay side of the Quilon jetty. Adequate terminal facilities should be provided at Alleppey, Quilon and other places.
- (e) The toe-walls on the sides of the canals at Alleppey and other places should be repaired.
- (f) In the stretch north of Cochin, two locks 150 ft. x 20 ft. should be constructed between Punani and Chetwayi to replace the earth dams.
- (g) The existing size of some of the locks north of Cochin being too small, new locks should be designed to the minimum dimensions of 150 ft. x 20 ft. to meet reasonable future requirements.
- (h) The stretch between Cochin and Badagara should be maintained at a minimum bed-width of 30 ft. with an effective depth of 5 ft. at low water level.
- (i) Road bridges should have a minimum head room of 16 ft. above high water level.
- (j) The proposed extension of the West Coast Canal north of Badagara upto Mahe should be designed to a minimum bed-width of 30 ft. and an effective depth of 5 ft. at low water level. In the rocky portions, if any, the width may be reduced to 20 ft.
- (k) The stretch between Quilon and Trivandrum should also be improved to a minimum bed-width of 30 ft. and an effective depth of 5 ft. at low water level except in difficult and rocky portions where the width may be reduced to 20 ft. The construction of wider tunnels at Verkalla may be considered only when traffic needs justify.

18.9. In view of considerable rock-cutting involved in the area beyond Mahe and in the absence of traffic survey figures, we are not in a position to recommend the extension of this canal beyond Mahe. The Central Organisation should take this up after completion of the traffic survey.

18.10. Improvements to Beypore river and a number of rivers connecting the hinterland with the Coast line should be planned after detailed hydrographic surveys.

18.11. The main factor that affects the expansion of bulk transport of oil by waterways from Cochin Port is the rigid restriction of licensing of tank boats with wooden hulls under rule 31 of the Petroleum Rules, 1937. Under this rule all craft carrying petroleum products should be constructed with double-skin or with tanks mounted on boats with steel hulls. While the approximate cost of a boat with a wooden hull inclusive of the 4 tanks to be installed amounts to Rs. 14,000, a double skinned steel barge is estimated to cost about Rs. 1,10,000. In view of the high cost and the short supply of steel and the fact that the oil companies have claimed that they have been using wooden tank barges over these waterways for over 30 years without any accidents, it was felt that there was a strong case for seeking exemption from the restrictions imposed by rule 31 of the Petroleum Rules, 1937. The Government of India have now, on the advice of the Chief Inspector of Explosives, permitted carriage of non-dangerous petroleum in wooden tank barges for a further period of three years. As the Petroleum Rules, 1937 were introduced on the analogy of Rules prevailing in the Port of London, we suggest amendment of these rules to suit local conditions bearing in mind the needs of a particular region and the safety factor.

Mysore:

19. The striking feature of the coastal strip of Mysore State north of Mangalore is the absence of through lines of communication either by railway, road or inland waterway. The main road north of Mangalore takes a detour inland to avoid the deltaic portion of the rivers while the coastal road is intercepted by swift-flowing rivers some of which have yet to be bridged. These rivers have their sources at heights varying from 2 to 3 thousand feet above sea level and are rapid and not navigable in the monsoon months as the drop to sea level is within a distance of 40 miles. A number of these have silted up in their lower reaches. There are a number of lagoons and backwaters formed by these rivers. The State Government have proposed a scheme of connecting the backwaters from Coondapur to Mangalore to form a continuous inland waterway providing a vital means of communication in the coastal strip. It was also suggested that this canal be extended in the North to link up with the river systems and their backwaters north of Coondapur upto Karwar and in the South to link up with the West Coast Canal in Hosdurg in Kerala State. But no detailed investigations or engineering surveys have been carried out.

19.1. The Committee visited the stretch of the coastal strip between Mangalore and north of Malpe and also the Mangalore and Malpe harbours. There are a large number of tile and cashewnut factories in this region which are likely to use this canal for their transport requirements. Malpe is also an active fishing centre. A canal link between Mangalore and Coondapur connecting the backwaters is likely to provide a useful waterway between the two ports of Malpe and Mangalore. This should be examined on receipt of the traffic survey report.

Bombay:

20. Bombay is the premier maritime State with longest Coast line of about 1,500 miles. In addition to the major Port of Bombay, there are numerous intermediate and minor ports all along the coast line. The Konkan region of Bombay State, i.e., from Goa border to Bassein creek, is very poor in communications. The Western Ghats extend right upto the sea coast. There is considerable coastal traffic both by powered vessels and sailing craft serving this region. The country craft ply along the coast and also operate in the creeks. There are a number of rivers and tidal inlets whose estuaries are navigable for varying distances from 4 to 40 miles from their mouths. The coastal and inland navigation are, therefore, closely interconnected in this region.

20.1. The Vasisthi river is at present navigable in its tidal compartment upto Karambavane, 4 miles downstream of Govalkot, and good depths are available in the entire length of the river except the outer bar approaching Dhabole Port which carries a depth of 8 ft. at low water. The river between Karambavane and Govalkot is shallow and almost dry at low tide and it does not appear likely that any definite improvement to the navigability of this stretch will be possible even after the tail discharge from Koyna is available unless some river training works are carried out. Karambavane has potentialities for developing into a good inland port after a road connection is provided to either Chiplun or Govalkot. There is a regular feeder service between Govalkot and Dhabole connecting the Bombay-Ratnagiri coastal steamer service, but this shuttle service can only operate upstream of Karambavane at high tide. At Govalkot, a 60 ton crane has been installed for lifting heavy equipment for the Koyna Project. We were informed that there is a considerable quantity of bauxite available in the vicinity of Koyna and with the availability of power on completion of Koyna Project, this region has good industrial potentialities.

20.2. The Sabitri river also known as Bankote creek is navigable upto Dasgaon during the spring tides but during the neap tides, the steamer service is terminated 6 miles downstream.

20.3. Regular passenger service is maintained by the Bombay Steam Navigation Company Limited between Bombay, Rewas Port and Dharamtar Port situated on the Amba river also known as Dharamtar Creek. About 500 passengers use this mode of transport daily as it is much shorter than road route.

20.4. We suggest the following measures for the improvement of waterways of Konkan region:—

- (a) Hydrographic surveys of the creeks upto their tidal limits should be undertaken.
- (b) Suitable dredgers should be provided to improve the navigable depths in the creeks.
- (c) Navigational aids for marking of shoals, rocks etc., should be provided to facilitate safe navigation of craft.

- (d) Co-operative societies of boat operators should be encouraged to operate their own small tugs in the creeks to assist quick turn-round of country boats during strong tidal conditions.
- (e) The problem of siltation at Rewas jetty in Dharamtar Creek should be studied in the model of the Bombay Harbour at the Central Water and Power Research Station, Poona, after the necessary data has been collected.
- (f) Extensive afforestation measures at the foothills in the catchment area should be undertaken.
- (g) Terminal facilities should be established at Karambavane and a road connection should be provided to Chiplun.

20.5. The Narmada river is one of the principal waterways draining the large water-shed of Central India and is about 800 miles long. The river is navigable, in its tidal compartment, upto Broach (30 miles from the mouth) by vessels of 70/80 tons capacity and thereafter by small country craft upto Chandod (about 40 miles upstream). The Port of Broach is situated on this river and handles about 85,000 tons annually. This river suffers from several limitations and we suggest the following improvements:--

- (a) A hydrographic survey of this river should be taken in hand immediately. On the basis of this survey, improvements should be planned.
- (b) A dredger should be acquired for dredging the bars on the basis of the hydrographic survey.
- (c) In the meantime, two shallow-draft tugs should be provided for towing country boats between Broach and the mouth of the river. This will improve the turn-round of the boats and enable them to cross the bars in one or two high tides.
- (d) Adequate ghat facilities should be provided immediately with approach road connections.

20.6. Various multi-purpose projects are likely to come up on this river in future years which will improve its navigability in its higher reaches. We are of the opinion that navigation aspect should be given adequate consideration while planning such multi-purpose projects.

20.7. The historical town of Surat is situated about 18 miles from the mouth of the Tapi river. Surat was once a flourishing Port and was the landing place for foreigners in the 19th century. There has been considerable deterioration of the navigability of the river and today sailing vessels can come upto Surat with difficulty. The river is navigable for small country craft and Bamboo rafts upto Kathor. In view of the siltation of the river at Surat there is a proposal to shift the port further down the estuary to Magdalla.

20.8. In the Kakrapar Weir Irrigation Scheme which is partially in operation, no provision has been made for future navigational development. This omission may involve disproportionately costly amendment works when navigation is introduced subsequently.

20.9. A new industrial estate is being developed at Udhana near Surat. There is, therefore, likely to be adequate traffic potential both for the coastal shipping and inland water transport. There is however, no possibility of linking Udhana township with the Tapi river by inland canal due to the existing topographical features.

20.10. We suggest that the following measures be adopted for effecting improvements:—

- (a) An immediate hydrographic survey of the entire stretch of the Tapi river upto its tidal limit should be carried out.
- (b) On the results of this survey, necessary dredging operations should be undertaken to improve the navigable channel.
- (c) In the multi-purpose projects now being planned in the higher reaches of this river adequate provision for future development of navigation should be made.

Bombay and Salsette islands.

21. The Port of Bombay is the most important Port on the West Coast. The Harbour is connected to a number of creeks such as the Dharamtar, Thana and Bassein Creeks and the Ulhas river. Inland water transport has not so far played any great part in the transport system of this area except for passenger traffic between Rewas and Dharamtar ports and Bombay city.

21.1. The population of Bombay has increased from 15 lakhs in 1941 to 31 lakhs in 1958 and from the recent report of the Study Group on Greater Bombay, the population of Bombay city and the suburbs is expected to reach a staggering figure of 75 lakhs in 10 years. The transport bottle-neck which has **already** developed, will become more acute in future.

21.2. The railways connecting the city of Bombay with its vast hinterland cater mainly for long distance traffic. With the rapid industrialisation of the city and new industries springing up in the suburbs as far as Kalyan, the transport requirements of Greater Bombay will soon present serious problems even in normal times, quite apart from any emergency, notwithstanding the proposed express highways. Development of water transport will considerably ease the situation.

21.3. The problems likely to arise in the development of water transport round Bombay and Salsette islands will certainly be difficult but not insuperable. The Bassein and Thana creeks have potentialities for development. The Admiralty Chart indicates that there is a minimum depth of about 2 ft. below lowest low water level at the head of the Thana and Bassein creeks. The river Ulhas receives tail discharge from the Tata Hydro Works at Khopoli. It may be possible to construct a barrage or a dam across this river to make adequate fresh water available for industrial purposes and for improving the navigability of the river. We, therefore, suggest that the following investigations be carried out immediately.

- (a) Hydrographic surveys of the Thana, Dharamtar and Bassein creeks and the Ulhas river.

- (b) Nature of sea bed at different shoals and the extent of rock cutting that may be necessary.
- (c) Head room under existing and new rail and road bridges at lowest and highest water levels and possibilities of providing adequate head room.

21.4. On the basis of these surveys, plans should be prepared by experts for development of water transport on these waterways and for terminal facilities at various points for the convenience of industrial establishments. This scheme will ultimately facilitate overside loading and unloading between I.W.T. craft and ships anchored in the stream in the port area and will relieve congestion in the Docks and the city. It will also provide a vital line of communication in this area especially in an emergency.

Rajasthan Canal:

22. A canal taking off from Harike Barrage on the Sutlej in the Punjab is under consideration. This canal, with a capacity of 18,500 cusecs at its head is an irrigation canal and has a total length of about 425 miles of which the first 111 miles will be in the Punjab and the rest in Rajasthan. While there are adequate communications in the Punjab, the area commanded by the Canal in Rajasthan is singularly void of railway or road communications. Irrigation facilities from the canal will bring prosperity in this area and are likely to create traffic potential for inland water transport. The canal has a very gentle slope and appears particularly suitable as a very important artery for inland water transport.

22.1. We feel that the case of this canal is very much different from that of other irrigation projects for which suggestions for provision of navigational facilities in the irrigation canals were advocated. Quite apart from topographical features which confer a distinct advantage to the Rajasthan area, there are other more important features which deserve special mention. Elsewhere in the country, development of transport facilities have reached a fairly advanced stage and the manufacturing industries and centres of trade have quite naturally been sited with due regard to the facilities offered by the transport system already existing in the area. As railways have been the most predominant mode of transport, such industries and centres of trade have naturally grown alongside the railways system. It would be difficult now to reorient this configuration, even if we succeed in providing adequate inland water transport facilities and there will be little chance of shifting these centres and moving the plant and machinery and the manufacturing industries to the proposed or future waterfronts.

22.2. The case with Rajasthan canal areas would be entirely different and presents a unique opportunity for the proper planning and co-ordinated development of the different systems of transport most suited for the needs of the area. The existing railway facilities are meagre and roads are almost non-existent. A very large area will soon be receiving the benefits of irrigation. Not only will the agricultural production be stepped up considerably but there will be a substantial surplus for export to other areas in the country.

Sizeable development in the matter of small-scale and large-scale industry is bound to follow. These developments, in turn, will require provision of adequate transport facilities for this area. Because of the poor facilities available at present there is the unique opportunity of planning out a proper system of transport with due regard to the relative advantages of the alternative modes of transport.

22.3. The growth of new townships, and more specially the siting of industries can be so regulated as to receive the greatest advantage from the system of transport provided as a result of planned development. In the circumstances, water transport will not suffer from the handicaps that it will have to face in other areas where the alternative means of transport have stolen a march over it. The problem of the provision of inland water transport facilities in the Rajasthan Canal system should be studied with this background. While we have not been able to go into the details of the canal project, the technical possibilities for the ready incorporation of the extra facilities required for rendering the proposed system suitable for navigation, and the economic feasibility of the project for the provision of water transport on this canal system, we do consider that if at all water transport on an irrigation canal is to have a fair chance, here is the right field for its introduction.

22.4. We, therefore, suggest that during the execution of the irrigation project it should be seen that the works at the headworks and along the canal route are so provided as would readily facilitate the introduction of inland water transport. The technical possibilities with due regard to economy and the volume of traffic in different zones should be worked out and suitable allowances and amendments made in the works designed to enable water transport to be introduced in the system. By provision of suitable accommodation, initially, in the various structures otherwise being built for the irrigation canal, a considerable saving can be effected in future plans for the provision of regular navigation on the canal. For this purpose we would suggest that a provision of about Rs. 2 crores should be made available, initially, as we consider that such an initial expenditure would not only facilitate the future introduction of water transport but may save considerable infructuous expenditure in reconstructing or modifying the existing structures.

Kashmir:

23. The valley of Kashmir is served by the river Jhelum and a number of lakes the important ones being the Dal Lake, the Nagin Lake and the Wular Lake. The city of Srinagar can be compared to Venice as it is situated on both sides of the river Jhelum and the edge of Dal Lake 5 miles long and $2\frac{1}{2}$ miles wide. The Jhelum river and the lakes are full of shikaras transporting passengers and the daily necessities. The Jhelum river, does not appear to be suitable for powered craft to operate. Timber is, however, floated down the river in considerable quantity, collected and distributed all over India by road and rail. The country craft have, therefore, been well developed and represent the *sine quo non* of life in and around

Srinagar. The Dal and Nagin Lakes are attractive tourist centres, providing bathing and surf riding facilities. A number of motor boats and house boats are available over these lakes.

23.1. In Srinagar alone there are numerous house boats and registered taxi shikaras catering to the needs of visitors. While the State does not appear to have much potentialities for powered craft except on the lakes, the indigenous country craft play an important role in the transport system of the State. The lakes also afford opportunities for numerous aquatic activities which help to make people water-minded.



CHAPTER VI

OUTLINE FOR MASTER PLAN, MULTI-PURPOSE PROJECTS AND FUTURE DEVELOPMENTS —CLASSIFICATION OF WATERWAYS.

24. One of the earliest uses of rivers has been inland water transport. Many great rivers of the world are by their very nature, well suited for this purpose. But navigation has, by no means, been confined to such rivers alone. Vast stretches of rivers which were not navigable in their natural state, or which presented difficult conditions for navigation, have been improved by suitable river training works. In addition, artificial waterways have been constructed by digging canals either to by-pass difficult stretches of rivers or to inter-connect seas, lakhs, rivers, etc.

24.1. In the Western countries, navigation has always occupied an important position among the various uses of the rivers. Originally river works were mainly confined to pure navigational structures. Later, however, the desirability of multi-purpose development of the rivers was appreciated and the navigational development began to be fitted into this frame work and is still continuing as one of the most important components. For example in the Tennessee Valley development in the United States of America, navigation and flood control were considered the most important uses and the other uses like power given a secondary importance. Currently the waterway development in almost all the countries like the Union of Soviet Socialist Republics and the United States of America has been mostly multi-purpose in character. The outstanding feature of the waterway development in Soviet Russia has been the creation of a unified system of waterways by inter-connection of rivers, seas, lakes, etc.

24.2. In India, the picture has been rather different. Before independence river valley projects were few and isolated. Though some individual projects which were multi-purpose in nature were executed, the application of the concept of the unified development of a river basin as a whole was made possible only after independence which resulted in the accelerated development of river valley projects. In India, irrigation has always been one of the most important uses of the rivers and has of necessity to continue to do so. Originally, the development of navigation was confined to provision of navigational facilities on some irrigation canals in addition to the construction of a few purely navigational canals such as the Buckingham Canal, Orissa Coastal Canals and canals around Calcutta, etc.

24.3. After independence, the pace of river valley development as well as industrialisation began to increase. It was only but natural that the application of the concept of unified development

of the river basin began to be seriously considered. However, the almost complete absence of navigational development in the country has left a legacy; when development of transport capacity is planned, the part that inland water transport can play is generally ignored. In river development projects also, the navigational aspect does not often receive due weightage. Fortunately, the Estimates Committee of the Lok Sabha in their sixty-first report, emphasised the urgent need of development of inland navigation in the country.

24.4. The Central Water & Power Commission considered that the unified multi-purpose development of the rivers could make vast stretches navigable and by inter-connecting some of these rivers a net work of waterways from costs to costs could be created. They accordingly prepared a rough outline plan which has been referred to as the 'Master Plan' for guidance in planning. The following are the main schemes outlined in the Plan:--

- (i) Linking the Ganga with west flowing rivers to provide a continuous waterways from the West Coast (Arabian Sea) to the East Coast (Bay of Bengal)
 - by (a) Connecting the Narbada with the Sone viz. the Johilla, a tributary of the Sone.
 - (b) Connecting the Narbada with the Sone (a tributary of the Ganga) *via* the Hiran and Katni Nai (tributaries of the Narbada and the Sone respectively).
 - (c) Connecting the Narbada with the Chambal *via* the Karam river (tributary of the Narbada).
 - (d) Connecting the Narbada with the Yamuna *via* the Bearma and the Ken (tributaries of the Ken and the Yamuna).
- (ii) Linking the Narbada with the Godavari to provide a continuous waterway from the West Coast to the East Coast.
- (iii) Linking the Tapti with the Godavari system *via* the Wardha to provide an alternative waterway connecting the West Coast with the East Coast *via* the Sone and the Rihand.
- (iv) Linking the Ganga with the Mahanadi.
- (v) Inland coastal waterway from Calcutta to Mangalore *via* Cuttack and Madras.

24.5. The representatives of the Central Water and Power Commission explained to us that the Outline Plan, was in itself not a blue print for specific schemes but it was only a basis for planning and for further investigations and that field investigations such as the extent of navigability of the rivers and their slopes in different stretches have yet to be carried out. The Central Water and Power Commission are pursuing further studies of the proposals outlined in the scheme and have prepared a preliminary draft report on linking the Narbada with the Sone. Investigations such as traffic potential have yet to be carried out.

24.6. As we had doubts about 'sufficient water being available in the rivers to be connected for both irrigation and navigation throughout the year, we requested the Central Water and Power Commission to examine the matter and let us have their views. They now inform us that they are studying the matter in detail but from the preliminary studies made so far they find that adequate water will be available in some of the rivers to be linked.

24.7. In the case of Central India, the ridge between the east and west rivers is more or less centrally located between the east and west coasts with the result that it would normally be economical for long distance traffic from one side of the ridge to go to the nearest port on the same side. In view of this, linking of the rivers on the two sides will mainly serve local needs, and this traffic potential may not be large enough to justify the expense that is likely to be involved in the construction of a large number of dams and the connecting links solely for navigation. We are, however, informed by the Central Water and Power Commission that a number of dams will be constructed on these rivers for irrigation and hydro-electric needs. These dams are likely to make long reaches of these rivers navigable. We, therefore, strongly recommend that all these dams when constructed should provide navigation locks and other facilities so that ultimately it should be possible to make these entire rivers navigable and to interlink them when the traffic needs justify.

24.8. A large number of projects are going to be constructed on the various rivers. In accordance with the current practice they have to be planned according to the concept of the unified multipurpose development of river basin and not be allowed to grow haphazardly. The reservoirs created by these dams will in any case make vast un-navigable stretches of rivers navigable. It must be ensured that this development would not jeopardise navigational potential but would rather aid it. The navigational aspect has, therefore, to be kept in view while planning the development of the river valleys and finalising the design features of individual projects by the provision of locks etc. in the dams.

24.9. The following are some of the important river valley projects:—

- (a) Nagarjunasagar Project (Andhra);
- (b) Tungbhadra Project (Andhra and Mysore);
- (c) Mayurakshi Project (West Bengal);
- (d) Damodar Valley Corporation Project (West Bengal and Bihar);
- (e) Kosi Project (Bihar);
- (f) Kakrapar Project (Bombay);
- (g) Chambal Project (Rajasthan and Madhya Pradesh);
- (h) Rajasthan Canal Project (Punjab and Rajasthan);
- (i) Hirakud Dam Project (Orissa);
- (j) Mahanadi Delta Irrigation Project (Orissa);
- (k) Bhakra Nangal Project (Punjab);
- (l) Rihand Dam Project (Uttar Pradesh).

Provision of navigational facilities on these and other projects likely to come up in the future should be examined by the Central Technical authority. With regard to provision of navigational facilities on the Nagarjunasagar Canal, the details available are not adequate for us to give a definite opinion. We suggest that full details such as traffic potential be investigated by the technical organisation. Our views on Rajasthan Canal Project are given in Chapter V.

24.10. One of the essential precautions to be taken in connection with the above projects should be to cut down all trees and other obstacles in the bed of reservoirs of the dams before water is stored in. Similarly contour maps of the bed of the reservoirs should be prepared to enable navigational routes to be easily marked for future use.

24.11. To explore the possibility of immediate development of navigation on certain important rivers and canals, we suggested in our recommendations that investigations should be taken in hand immediately to ascertain how far they could possibly be made navigable, without prohibitive cost, for minimum depths as indicated below:—

- (a) Stretches likely to afford a depth of 6 ft. to 8 ft. from the mouth inland.
- (b) Stretches likely to afford a depth of 4 ft. to 6 ft. in continuation of (a).
- (c) Stretches likely to afford a minimum depth of 3 ft. to 4 ft. in continuation of (b).

24.12. We have suggested that studies on the above lines should be carried out on the following rivers and waterways, both at the end of the monsoon and during the low water season:—

- (a) River Ganga from Allahabad to Kanpur—a distance of 155 miles.
- (b) River Yamuna—Allahabad to Chambal river—a distance of 290 miles.
- (c) River Tapti—Surat to Bhusawal—a distance of 232 miles.
- (d) River Narbada—Broach to Hoshangabad—a distance of 370 miles.
- (e) River Mahanadi—Cuttack to Dholpur—a distance of 107 miles.
- (f) River Godavari—Dowalishwaram Anicut to Pranhita—a distance of 260 miles.
- (g) Sabari and Sileru, tributaries of the Godavari river.
- (h) Krishna river.

Our idea in making this recommendation was try and see how far these rivers could be made navigable from the mouth upwards, thus generally cutting across road and rail communications and not running parallel to them. This data was not available to us at the time of submission of this report. When these investigations are completed, it should be possible to ascertain how far and at what cost we could make our important rivers navigable from the mouth upwards into the hinterland.

24.13. It is necessary to classify the navigable and potentially navigable waterways of the country in accordance with certain standard specifications as is the practice followed by most of the Western countries. In fixing these specifications and standards, especially at this stage of development and planning of our country's waterways, it is essential to put forth suggestions which can be applied practically on most of the inland waterways. We, therefore, recommend that classification should be done on the following basis with a view to ultimately developing a unified net work of waterways which can accommodate the most economical types of vessels with maximum draft throughout the year.

Class	Navigable minimum depth at		Width of Channel
	H.W. Season	L.W. Season	
	ft.	ft.	ft.
I	8	6	400
II	6	4	300
III	4	3	150

(The upper reaches of a number of main rivers and tributaries normally carry less than 3 ft. depth of water for a period of one or two months each year during the low water seasons and a "no navigation period" should be permissible for this category when repairs to craft could be effected.)

24.14. We do not recommend classifying the navigation canals according to the tonnage of load they accommodate as is the practice in the European countries, as practically all our canals would fall into one category viz., under 300 tons. We, therefore, suggest the following classification for canals:—

Class	Minimum depth	Minimum bedwidth
	ft.	ft.
I	Over 6	50
II	6—4	30
III	4—3	20

CHAPTER VII

Country Boats and Ferries

25. Country boats of varying sizes and shapes have plied along the waterways of the country from time immemorial. Propulsion is by oar, sail or towing line. In a few isolated cases experiments with self-propelled craft or mechanised towage are being tried.

25.1. The shape and design of the country craft vary from State to State, the general principle followed is to design the craft to suit local requirements of a particular waterway and the needs of traffic.

25.2. These craft possess advantages and disadvantages over other types. They are comparatively cheap to build, the initial cost of a 50 ton boat being in the region of Rs. 12,000 against Rs. 35,000 for a steel barge of similar capacity. A self-propelled barge will of course cost many times the latter figure. In areas where there are no other means of access and also where self-propelled craft are unable to ply, the country boat has a considerable part to play in the transport system of the country. In addition, on feeder rivers and canals where depths are limited and powered craft are restricted for one reason or another, country craft can and do provide feeder services to the main line services of the inland water transport, road and railway operators. These main advantages are off-set to some extent by the difficulty of ensuring that craft are constructed of properly seasoned timber and good quality materials and to the fact that except in the major and minor port areas they are neither registered nor are they subject to periodical surveys. Another disadvantage is that they are not suited to bulk and speedy movement over swift flowing rivers. There are, in many areas, also difficulties in connection with documentation and insurance cover, but in some areas these have been overcome.

25.3. This cheap and readily available mode of transport can be re-established with support from the Government. It is recorded that during the period 1937-38, 5½ million tons were carried through the Eastern and Calcutta canals of Bengal. The subsequent partition of the country has resulted in a progressive reduction in inter-State traffic, but even now large quantities of traffic and number of passengers are carried by country craft in this area and also in many other States throughout the country.

25.4. It is necessary to ensure that country boat traffic is not hindered through ferry operators restricting their scope by not allowing them to utilise ferry ghats except by paying excessive tolls. This also applies to traffic passing over the canals where State Governments levy heavy dues. The Governments concerned should, therefore, take immediate steps to ensure that neither unnecessary restrictions nor excessive tolls impede the operation of country craft. Should no steps be taken now to stop the decline in the use of

country craft, Government's main asset in dealing with flood relief, will eventually disappear and they will find themselves with no alternative remedy available.

25.5. Quite apart from removing the difficulties some of which we have mentioned, it is necessary to organise the operation of country craft in a way that will increase the transport potential and also improve living conditions of boatmen and their families. The first essential step is for the State Governments to organise country boats on a co-operative basis on a country-wide scale. Strong co-operatives are essential to provide facilities to the boatmen which are beyond their individual capacity. These will enable them to win the confidence of the trading community and secure a steady flow of traffic. The State Governments should provide adequate traffic to such co-operatives even at some cost and inconvenience to themselves. It is also essential to ensure that whatever assistance is finally given, the boatman is the recipient and not the middleman of whom there are many.

25.6. Various suggestions have been made regarding possible improvements in design. While some improvements may eventually be possible, the first step should be to ensure that sound craft are available at reasonable cost. The boat building industry has many hundreds of years of tradition behind it and each individual type of craft whether it be a 'Vallam' from Kerala or a 'Bhur' from North East region, has been proved by trial and error by the men who ply them, by the builders who build them and by the boat owners. It is, therefore, essential to ensure that these traditions are not lost. It is necessary to provide the boat builders with suitable and well seasoned timbers and other stores at reasonable or subsidised cost. By this means interest will be stimulated by enabling the boat builders to offer to the co-operative societies craft at reasonable cost.

25.7. The carrying capacity of country boats is already low and the installation of machinery would further reduce this capacity and make country boat services uneconomical. Generally, a number of types of country boats do not lend themselves easily to mechanisation. The average boatman is not capable of operating and maintaining marine engines. We are, therefore, not in favour of mechanisation of country craft but suggest that they should be made suitable at little cost for towage by powered craft as and when required, especially in waterways with strong currents. This facility is likely to increase their turn-round and efficiency without loss of carrying capacity. The Central Technical Organisation should organise the operation of tugs by the boatmen's co-operative societies.

25.8. In major Ports like Calcutta and also in minor ports, no craft is permitted by the authorities to enter the Port area without registration and a load-line certificate, but this is not so in a number of other areas where, inland water transport is established. We, therefore, suggest that the Transport authorities in each State should build up an organisation which should be responsible for ensuring that all craft on their waterways are riverworthy. The Mercantile Marine Department of the Central Government and the Central Technical Organisation should be in a position to assist in training personnel for this task and also the co-operative societies in their administration.

25.9. Unfortunately the country boat is hardly likely to give steady occupation and a living wage to the boatmen. It is, therefore, absolutely essential that boatmen, whether organised on co-operative lines or otherwise, should be helped to augment their earnings by other occupations like fisheries and cottage industries which they could follow in their spare time, on board the country craft.

26. Ferries which transport men and material across waterways perform an important function. With the exception of the ferries operated by Railways and organised inland water transport operators on the Ganga and the Brahmaputra where safety regulations are observed, we found that the operation of ferries in most parts of the country was inefficient and inadequate. The existing system whereby licences for operation of ferries in most States are auctioned to the highest bidder irrespective of his qualifications and competence, has led to numerous malpractices.

26.1. In most instances we found contractors so appointed have no interest in the development of the respective ghats or adequate upkeep or safety of the ferry boats, their vital concern being in the maximum profit they are able to obtain from their investment. It has been mentioned to us that the amount realised by auctioning of ferries in one particular region in North-East India recently amounted to more than double the previous year's bid. The successful contractor was, obviously, able to offer this high figure because of the big profit he expected to make at the expense of other country boat owners and the public. He, naturally, neglects repairs, connives at overloading and other irregularities without which it is difficult for him to make any profit.

26.2. Instances are numerous when country boat ferries have capsized with considerable loss of life due to inadequate safety measures and over-crowding. It is no consolation to hold an elaborate enquiry after the accident when it is a well-known fact that accidents are due to over-crowding and neglect of repairs. Over-crowding in boats takes place some times even against the protests of boatmen whenever there are large crowds attending fairs and festivals who are anxious to return to their homes regardless of safety considerations.

26.3. The Northern India Ferries Act, 1870, and similar other Acts in other parts of India have largely contributed to ruination of country boat traffic. We recommend that the running of ferries should be treated as a Governmental responsibility regardless of expenditure and that the pernicious system of auctioning of ferries to contractors should be given up forthwith. People have a right to expect Government to construct roads and bridges for their convenience. They have, similarly, the right to expect Government to run ferry services on all important rivers until they are bridged and ferry services become unnecessary. The existing Northern Indian Ferries Acts and other similar Acts in other States should be repealed.

26.4. State Governments should undertake through appropriate ferries in their States except those run by Railways, Port authorities and State Transport. They should also undertake supervision

and control of all country boats given to village Panchayats and others for flood relief through Panchayats, N.E.S. blocks or otherwise.

26.5. Government will have to spend money on these services rather than expect to make money by auctioning them to contractors as has been happening all these years. The experience of Railway ferries should be enough to prove that an efficient ferry service cannot be run without spending money on it. We, therefore, hope that Government will accept our recommendation to run all ferry services regardless of profit. This is already being done in some places by the State Governments of Uttar Pradesh and Kerala. There is no reason why other State Governments should not follow suit and run their own ferry services. They will, naturally, require technical staff to organise these services, the need for which we have already stressed in Chapter IX dealing with governmental organisation for development of inland water transport.

26.6. We find that on the Hooghly, the ferry services once operated by the Port authorities within the Port area and subsequently taken over by a private company, have stopped functioning. Apart from relieving congestion on other modes of transport, in an over-congested city like Calcutta, particularly in areas close to the banks of the river, these ferry services had, for years, rendered excellent service in providing transport and recreational facilities and have also been instrumental in making people water-minded. We feel that the State Government, Port authorities and Corporation should take immediate steps in this direction. Other Ports like Bombay and Cochin, lend themselves to the development of ferry and harbour excursion services as is common in all parts of the world. If existing laws do not allow Port authorities to run such services, we recommend that the laws should be amended. Excursion services run by Port authorities should prove a great attraction for tourists.

26.7. Large new reservoirs are now coming into existence all over India due to multi-purpose river valley developments. Now ferry services will become necessary on these reservoirs. We recommend that the State Governments should organise these ferries and also run excursion services so as to make people water minded. Powered craft with adequate safety measures will have to be provided for this purpose.

26.8. With the current large increase in road traffic by motor cars and diesel trucks, it seems to us very necessary that State Transport departments should organise their own ferry services on all highways to facilitate through traffic. It should be considered a duty of State Transport organisations to provide efficient and quick ferry services for all mechanised traffic, which could also be utilised by bullock carts and other slow modes of transport.

26.9. We also recommend that the Railway administration should run more ferry services wherever possible as a gesture of their interest in development of inland water transport.

26.10. Ferry disasters generally take place because of over-crowding—particularly during fairs and festivals. It is difficult for boatmen to control crowds and prevent people jumping into boats at the

last moment, thereby risking their own and other people's lives. We recommend that the police should make special arrangements at all fairs and festivals to control crowds at ferry ghats and ensure that safety precautions are duly observed by the passengers as well as boatmen concerned.

26.11. State Governments should also make arrangements to ensure that all boatmen in charge of ferries are properly trained, that the craft used are in good state of repairs and that the load line is properly marked on all boats to enable the police to check overloading.

26.12. State Governments will have to take even great precautions to organise and control the activities of all boats meant for flood relief. The organisation which we have recommended under State Governments in Chapter IX will have enough work on its hands in organising ferry services, looking after flood relief boats and generally organising country boat traffic including formation of co-operative societies of boatmen and helping them with ancillary occupation.

26.13. The employment, potential of country craft and ferries is considerable and should not be lost sight of. Expenditure on organising country boat services would be fully justified even on this account.



CHAPTER VIII

Construction of I.W.T. Craft, Engines and Auxiliaries—Training Facilities

27. Self-sufficiency in all ancillary fields is as essential in water transport as in any other industry. We find we are sadly deficient in this respect.

27.1. In the highly developed water transport system of North East India, a number of companies operate and the craft are of varying types. Paddle steamers operating singly or towing flats or large covered barges are used by the Joint Steamer Companies. Some operators use screw propelled launches and tugs to tow flats while others employ war-time tank landing craft known as L.C.Ts. Most of the craft at present operating are old and we were told that a good percentage of the fleet requires replacement in the next 10 years. The maintenance and repair costs have gone up considerably which in their turn have reflected on the transport cost. In the interest of economic operation of inland water transport, both for the operators as well as for the community, it is essential to find the means for the replacement of the craft, as far as possible, within the foreign exchange resources of the country. It is also desirable to evolve standard designs of propelling machinery and auxiliaries from the point of view of efficiency and economy.

27.2. Although there are a number of Ship-building and repair workshops in Calcutta and other ports, manufacture of propelling machinery has not been taken in hand. It is only recently that one of the firms succeeded in manufacturing 10 Steam Marine Reciprocating Engines of 420 I.H.P. in the country. This venture has, unfortunately, not met with the encouragement that it deserves by way of adequate orders. In all countries, I.W.T. craft are turning to dieselisation which generally offers the maximum efficiency and economy. In cases such as the Damodar Valley Corporation Navigation Canal where frequent interruptions are inevitable due to a number of locks or for long distance transport such as from Calcutta to Assam where considerable bunker capacity is taken up by coal, diesel craft are advantageous. A few firms are already manufacturing stationary diesel engines in the country and we are of the opinion that every encouragement and financial assistance should be given to these firms to expand their scope to marine diesel engines ranging from about 40 to 250 B.H.P. With the possibility of establishment of a second ship building yard in addition to the existing one at Visakhapatnam, demand for auxiliaries and other small engines is bound to increase.

27.3. Another pressing requirement for the improvement and maintenance of waterways is the construction of dredgers. The Ganga Brahmaputra Water Transport Board had a 12 inches cutter-

suction dredger built in Calcutta in one of the Ship-building and repair workshops in conjunction with a well known Dutch firm. By this means foreign exchange component of the cost of the dredger was reduced to 55 per cent only. This is a step in the right direction. In view of the urgent necessity for several dredgers for the improvement of our waterways, similar measures in collaboration with foreign firms specialised in this field, should be encouraged with the object of not only saving valuable foreign exchange but also of acquiring the necessary technical knowledge and experience.

28. The crews of inland craft, particularly in North-East India, were mainly drawn from East Bengal. With the partition of the country the question of training Indian Nationals in adequate numbers to man our river and sea going vessels has become urgent.

28.1. The West Bengal Government have set up a training centre for preliminary training of I.W.T. crews at Calcutta. The Joint Steamer Companies operate a training ship on which personnel passed out from this Centre receive further practical training prior to appointment on their vessels. Other inland water transport operators also offer training facilities. These efforts, though commendable, touch only a fringe of the problem. For instance, the West Bengal Government training Centre turns out about 400 boys per year and has so far trained nearly 3,000 ratings, since its inception. There are more than 550 powered vessels and 1,700 dumb barges, mostly belonging to I.W.T. operators and Port Commissioners, registered with the Mercantile Marine Department, Calcutta. The total number of Deck and Engine Room Ratings and Serangs and Drivers to man these vessels is about 14,000. It may, therefore, take a minimum period of about 30 years to man all our vessels in this region by Indian Nationals. The magnitude of the task and the inadequacy of training facilities can be readily appreciated.

28.2. Acute shortage of Indian Nationals among qualified personnel like Masters or Serangs and Drivers who form 10 per cent. of the total is the crux of the problem. It takes a considerable time for a lascar to obtain the necessary training and experience and certificate of competency to qualify himself as a Master or Serang in charge of an inland vessel. While it is not advisable to curtail the minimum period of training and service required for obtaining the certificate of competency as a Serang in charge of navigation or a Driver in charge of the Engine Room, some relaxation should be permissible especially in the case of bright boys who have shown considerable aptitude during their training. We suggest that along with training lascars for the Merchant Navy, the Government of India should also undertake training of personnel in adequate numbers to efficiently operate and maintain I.W.T. craft and dredgers. Facilities exist at a number of workshops in the country for training Engine Room personnel, while Serangs and Dredging Masters could be trained at various Port Organizations, etc. Technical Institutions like the I.L.O. Centre at Rangoon, where advanced diesel mechanics are given advanced training, should be utilised to a greater degree than at present.

28.3 In the present state of the waterways of the country, the shortage of adequate number of trained officers to carry out hydrographic surveys, investigations and conservancy measures, is acutely felt. The efforts of Bombay Minor Ports Organisation in having a few civil engineers trained as Hydrographic Surveyors are commendable. It is essential that Government should immediately recruit civil engineers or navigating officers with sea experience or experience of inland waterways or cadets passed out from the Training Ship, Dufferin. They should be given intensive training at Marine Survey Organisation at various ports and with I.W.T. Organisations like the Joint Steamer Companies who are carrying out hydrographic surveys and conservancy of the waterways in North-East India.

28.4 We feel that properly trained technical staff would be able to achieve concrete results with comparatively small expenditure particularly in specialised fields such as bandalling and river conservancy.

28.5 The organisation of various measures for training personnel which we have briefly indicated above should be one of the most important functions of the technical organisation under the Ministry of Transport & Communications. It should be the responsibility of the Ministry to ensure that all I.W.T. craft in India are manned by Indian personnel as early as possible. This Ministry should also take steps to organise the manufacture of I.W.T. craft, diesel engines, dredgers and auxiliaries in the country at an early date.



CHAPTER IX

Government Organisation for Development of Inland Water Transport

29. Shipping and navigation on inland waterways, as regards mechanically propelled vessels, and the Rule of the Road on such waterways are primarily the concern of the Central Government. The Estimates Committee of Parliament in their 61st Report on Inland Water Transport have rightly stressed that the responsibility for development of this industry and effecting necessary co-ordination with other modes of transport, must rest with the Central Government in the Ministry of Transport and Communications. This Ministry has, however, little or no technical staff at its disposal to discharge this responsibility. The functions of the Mercantile Marine Department, a technical marine organisation under the Ministry are entirely confined to maritime shipping except for registration and survey of mechanically propelled craft and barges plying in the Ports of Calcutta, Bombay, Cochin, Madras and Visakhapatam which are undertaken by them on behalf of the State Governments. Even the Ganga Brahmaputra Water Transport Board, a regional organisation set up for development of water transport in North East India, has inadequate technical staff.

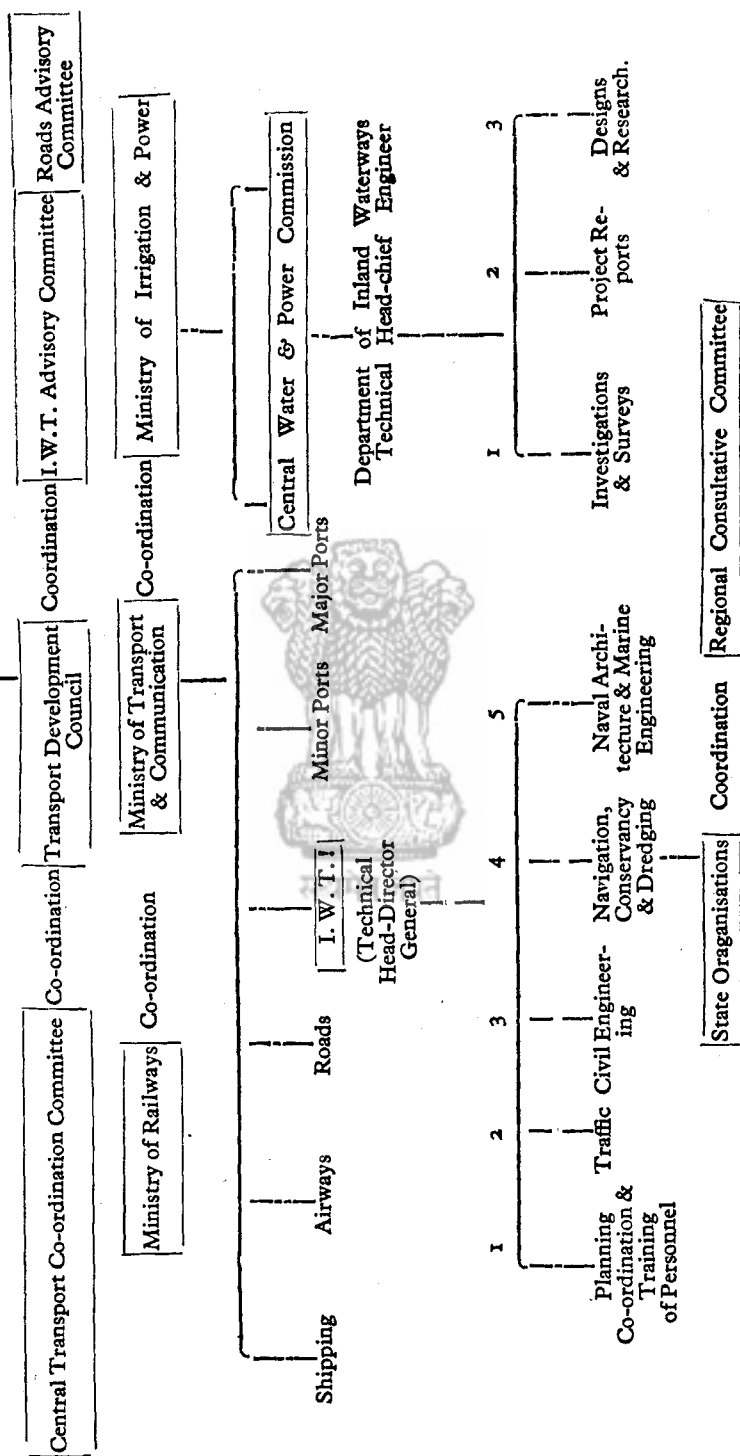
29.1 The navigational potential of any waterway can only be determined and planned in close co-ordination with the utilisation of water resources for other purposes. The Central Water & Power Commission under the Ministry of Irrigation and Power, is closely connected with all aspects of multi-purpose river valley developments including inland navigation. Earlier this body was designated as the Central Waterways, Irrigation and Navigation Commission. With the dropping of the title of navigation, this subject was automatically relegated to a secondary place and the Navigation Directorate has at present inadequate technical staff.

29.2 The State Governments, with the exception of one or two, have neither the organisation nor the technical personnel for developing water transport on sound lines and for maintaining the few existing waterways in good condition. In some of the States, the various forms of transport are dealt with in different departments. The Transport Commissioners under the State Governments are interested only in road transport. They are not charged with any responsibility of looking after inland water transport.

29.3 The Estimates Committee in its 61st Report suggested the formation of an Advisory Committee to advise the Ministry of Transport on matters pertaining to river navigation. Accordingly, the Road and Inland Water Transport Advisory Committee was set up by the Government. This Committee included three non-official representatives interested in the development of water transport. Recently a Sub-Committee has been set up for Inland Water Transport under this Committee, but we feel that this measure will once again relegate it into the background. We, therefore, strongly recommend that the Road and Inland Water Transport Advisory Committee be split up into two separate Committees, one for the Roads and the other for Inland Water Transport both under the Chairmanship of the Minister of State for Transport and Communications. Only thus will adequate attention for development of this mode of transport be ensured and save its being subordinated to other forms of transport as in the past. With the increased interest in inland navigation lately being shown all over India, the Transport Development Council will now be in a position to give the necessary stimulus to inland water transport. Co-ordination has to be effected between (a) the various Ministries of the Central Government; (b) the Advisory Committees of the Central Government; (c) the Central and State Governments; (d) the requirements of the private and the public sectors and (e) the different modes of transport including Railways, Roads, Inland Water Transport and Coastal Shipping. Such co-ordination is essential for the proper development of the transport systems of the country and for ensuring inland water transport its rightful place. We consider that the formation of a separate Advisory Committee for inland water transport alone will be able to achieve these objectives.

29.4 The above suggestions relate to co-ordination and formation of policy, but the immediate task of physical planning and execution of schemes must receive the promptest attention. A programme of works has to be drawn up, specific schemes prepared by the State Governments have to be examined and projects formulated, technical and financial sanctions have to be obtained and a programme of actual execution of works has to be set in motion to be carried out expeditiously and efficiently. For this purpose an Inland Water Transport Organisation in the Ministry of Transport & Communications should immediately be created under an expert technical officer designated as Director General of Inland Water Transport. For efficient despatch of administrative work and adequate representation and elucidation at the highest levels in the Government, we consider that this officer should have the status of a Joint Secretary. He should be given the organisational set up analogous to that of the Consulting Engineer, Roads, for administrative work together with the technical organisation (shown on the opposite page). Similarly, because of the largely increased volume and complexity of work that will now be required to be undertaken in the Central Water & Power Commission as a result of our recommendations, the skeleton organisation now available in the Waterways, Irrigation and Navigation Directorate will have to be expanded and upgraded and placed in charge of a Chief Engineer who should be conversant with the problems and requirements of waterways.

GOVERNMENTAL ORGANISATION FOR DEVELOPING INLAND WATER TRANSPORT



29.5 The functions of the two Organisations should be as follows:—

I. Inland Water Transport Organisation of Transport Ministry:

- (a) To study the transport requirements of the country with a view to co-ordinate inland water transport with other modes for—
 - (i) immediate requirements; and
 - (ii) long term planning.
- (b) To set up a technical organisation for prompting inland water transport in conjunction with the Central Water & Power Commission and to make a careful study of all proposals on a large scale relief model to be set up.
- (c) To study modern developments in all aspects such as improved design of craft, navigation aids, terminal facilities and conservancy. Necessary research should also be carried out.
- (d) To draw up standards for classification of waterways, size of locks and clearance under bridges, etc.
- (e) Setting up of suitable training establishments such as training of—
 - (i) diesel mechanics;
 - (ii) Deck and Engine Room personnel; and
 - (iii) Conservancy and technical staff.
- (f) To co-ordinate and guide activities of the State Government and amalgamating the existing organisations in the Centre.

II. Inland Waterway Organisation of the Central Water & Power Commission:

- (a) To study the existing waterways in the country and formulate schemes for their improvements.
- (b) To prepare technical reports on design of waterways and connected structures.
- (c) To formulate proposals for extension of navigability of Inland Waterways for immediate and short term* implementation having regard to availability of water under Irrigation, Power, Multi-purpose Projects. Any special project to be undertaken purely for navigation must also be considered.
- (d) To investigate and prepare project reports designs and estimates after carrying out necessary structural and hydraulic model tests for the above due consultations and co-ordination with State Chief Engineers concerned and the Organisation of Inland Water Transport to be set up under the Ministry of Transport.

*Short term means a period of 30 years.

29.6 The State Governments should also set up their own technical organisations to study details and prepare schemes with project reports for development of new waterways and maintenance of existing ones, under the guidance of the Central Organisation. The initial preparation of schemes will necessarily have to be done by the State Governments concerned as it is impracticable for the Central Organisation to prepare them for the entire country. These schemes will have to be examined by the Central Organisation which, after taking a comprehensive view of the situation, could press the claims of inland water transport before the Ministry of Finance and the Planning Commission.

29.7 In the present state of development of inland water transport and in the light of our recommendations for setting up organisations at the Central and State Government levels, we do not consider that any useful purpose will be served by having regional or inter-State Boards. We consider that each State Government should develop its waterways through its technical staff. The Central Organisation should undertake co-ordination of different schemes and deal with the inter-State problems which may arise and press the claims of inland water transport before the Ministry of Finance and the Planning Commission. Under the circumstances, we consider that it is no longer necessary for regional bodies like the Ganga-Brahmaputra Water Transport Board to exist.

29.8 We have separately indicated in other chapters some of the duties and responsibilities which will have to be undertaken by I.W.T. organisations under State Governments. In particular we would invite a reference to paragraph 26.12 of Chapter VII which deals with some of the important functions of this organisation relating to country boats and ferries.

29.9 We need hardly stress the very great importance of employing staff with practical experience of I.W.T. whether at the Centre or the State Government level. Inland Water transport cannot develop as it should, if posts are filled up by men without practical training and experience or by non-technical men.

CHAPTER X

Replies to Terms of Reference

30. Against the background as stated in previous chapters, we shall now attempt specific replies to our Terms of Reference. Our main difficulty arises from the fact that while we found a good deal of enthusiasm for development of inland water transport all over India, the basic data necessary for consideration of the subject is lacking and could not be made available to us in spite of the best efforts of the Central and State Governments and their officials as well as Chambers of Commerce and other non-official bodies and organisations interested in the development of inland water transport. We found it difficult to get information even about the actual number of country boats or boat building yards. What is even worse, we found almost complete absence of qualified technical staff conversant with different aspects of inland water transport at the disposal of the Government of India or the State Governments mostly concerned with the subject.

30.1 Unfortunately in the past no serious attempt appears to have been made to develop our waterways. The authorities concerned considered it sufficient to have a canal or waterway constructed by irrigation engineers leaving the development of transport services to private interests. There was no organisation to look after the maintenance of these waterways. This has led to the virtual extinction of inland water transport at various places in India and is threatening the continued operation of inland water transport at the few places where it is still carrying on a precarious existence.

30.2. Inland water transport has been able to develop in the more advanced countries of the West, because it is properly organised and receives necessary backing and encouragement from the Governments concerned. The income received from tolls etc. is not equated with the maintenance expenditure on canals and waterways, the indirect benefits to the community being given greater weightage. Almost invariably, the expenditure figures are several times more than the figures of income in these countries. Unfortunately, in India, the position is different and we still seem to think that inland water transport can develop without any expert organisation and guidance and without Government spending large sums of money to develop and help this industry to make up the back log of utter neglect for the last 100 years.

30.3 It is against this background that we included in our interim recommendations, what we consider to be our most important recommendation, that Government should immediately set up a strong technical organisation under the Ministry of Transport and Communications with a complementary organisation in the Central

Water and Power Commission under the Ministry of Irrigation and Power to study the whole problem in the light of modern conditions and the advance made in science and technology and draw up concrete schemes for development of inland water transport in India. A strong Central Organisation of this kind is absolutely necessary to enable the Ministry of Transport to implement the undertaking which they have given to the Estimates Committee of Parliament to accept responsibility of co-ordinating and developing inland water transport in India.

30.4 We similarly recommend that all States interested in inland water transport should now set up their own technical organisations to study details and prepare schemes which will stand scrutiny and qualify for allotment of funds by the Planning Commission. Our labours during the last two years have resulted in a number of ideas being collected, which we have set forth in the preceding paragraphs. We would however urge that all these ideas will have to be further examined and worked up into specific schemes, before they can be considered by the Planning Commission. It need hardly be pointed out that all these schemes will have to compete for funds with other schemes for improvement of transport capacity which may be put up by the Railway Authorities and the various organisations dealing with road transport. The Planning Commission will, naturally, have to be satisfied that a certain amount of money spent on inland water transport in any given area is likely to bring about better results in easing the transport position than the same amount of money spent on improving railway or road communications in that area, taking also into account the indirect benefits.

30.5 Another one of our interim recommendations referred to the need for traffic surveys to be carried out under the overall control of the Central Ministry of Transport in close co-operation with the Central Ministry of Railways and the Transport Commissioners under the State Governments. A number of these traffic surveys have not yet been completed. Only two traffic survey reports have been received, viz., the one relating to the Buckingham Canal and the other to the Mahanadi delta in Orissa. We feel that the results of all the traffic surveys when completed should be carefully examined by the Technical Organisation under the Ministry of Transport and Communications in consultation with the State Governments.

31. Our first Term of Reference is—

“To review the part played by Inland Water Transport in the transport system of the country”.

The historical background and the present state of inland water transport have been admirably summed up in the sixty-first Report of the Estimates Committee of Parliament, 1956-57. We have ourselves dealt with some aspects of this question in Chapter III of our Report. A detailed description of all the waterways in India with suggested improvements has been attempted in Chapters IV and V. The information given in these Chapters is necessarily based on

whatever was made available to us by the State Governments and other parties concerned, together with what was available with the Central Water and Power Commission and what little we could ourselves collect during our tours. It is likely that further investigation will reveal other and more promising fields for development of inland water transport than what came to our notice. As an illustration might be mentioned the idea of developing inland water transport on the creeks and rivers surrounding Bombay and Salsette islands which occurred to us when we visited Bombay although no such scheme had been put forward in any of the memoranda sent for our consideration.

31.1 While inland water transport played a dominant role in the development of the country before railways and metalled roads came into existence on a large scale, we feel that, in the present circumstances this mode of transport can best be developed in certain specified areas mentioned below where conditions are favourable:—

- (a) North-East India including Bengal, Assam and Cachar.
- (b) The Port of Calcutta and its hinterland including Sunderbans, Bihar and Uttar Pradesh.
- (c) The creeks and rivers round Bombay and Salsette islands.
- (d) The backwaters and canals of Kerala.
- (e) The Delta Canal system of the Mahanadi leading to the port of Paradip.
- (f) The Krishna and Godavari rivers and their Delta Canals.
- (g) Coastal Canal linking backwaters along the Mysore Coast.
- (h) The Narbada, Tapti and Vasisthi rivers in Bombay State.
- (i) New canals which have come into existence as a result of multipurpose river valley developments.
- (j) Ferry services over all the waterways and reservoirs of multipurpose dams.
- (k) Kashmir valley where inland water transport has a part to play in attracting tourists.
- (l) Buckingham and Vedaranyam Canals.

31.2 At any rate, we suggest that it would be preferable to concentrate on these regions in the first instance. When inland water transport is properly developed here, we could turn to other and more difficult areas.

32. Our second Term of Reference is—

“To advise on measures for the increased utilisation of inland water transport including movement of bulk commodities to ports for purposes of export and movement of bulk commodities from the ports to the interior account being taken of what is already contemplated under the

Second Five Year Plan for the development of inland water transport, and to give an estimate of—

- (a) the time needed for the execution of the schemes recommended, and
- (b) their cost."

We shall deal with this separately with reference to individual ports.

Calcutta.—Inland water transport from Calcutta to North Bengal, Assam and Cachar is vital and every effort should be made to maintain the existing facilities on this route and to improve them as far as possible. Proper arrangements should be made for conservancy and maintenance of the Brahmaputra and other rivers and the Sunderbans route near Calcutta. A good part of the fleet operating on this route will need replacement at an early date. The question of co-ordination of different modes of transport on this route has been solved to some extent but needs constant attention.

32.1 The problems of maintaining and improving inland water transport services on this route are extremely complicated and involve issues which impinge on our relations with Pakistan and the newly set up Water Transport Authority in that country. Conditions governing these waterways are liable to rapid changes and alterations from time to time. We do not consider it expedient to discuss them further in this report. We would strongly urge that the Ministry of Transport and Communications should pay continuous and very special attention to these issues in consultation with all concerned and see that everything possible is done to maintain inland water transport to Assam and Cachar at the existing level and improve on it as and when the needs of these areas increase from time to time with the execution of the Third and subsequent Five Year Plans.

32.2 We hope that this, our most important Port, will have its life prolonged by the implementation of the Ganga Barrage Project at a very early date. This project will bring into existence a new link between the Port of Calcutta and the hinterland in Bihar and Uttar Pradesh.

32.3 It is essential to take early steps to successfully develop inland water transport on the Damodar Valley Corporation Canal from Durgapur. This canal serves a highly industrialised area where a transport bottleneck exists which is likely to become more acute in future.

32.4 **Bombay.**—Inland water transport does not, at present, play any part in the activities of this Port. Nature has, however, provided a number of creeks and rivers round Bombay and Salsette island. It is necessary to carry out hydrographic surveys of these rivers and creeks and draw up a Plan for development of inland water transport in this area with a view to disperse industry and population on the main land on the north, east and south of Bombay and Salsette islands.

32.5 Bombay and its suburbs are highly industrialised and a transport bottleneck has already developed. The position is likely to become more acute in the next ten years when the present population of Greater Bombay of 43 lakhs is expected to reach the staggering figure of 75 lakhs. It is not possible to cope with the expected increase in traffic solely by improvement of rail and road communications. We, therefore, feel that it is essential to develop inland water transport in this area both from the ordinary transport point of view as also from the point of view of civil defence, the need for which may well arise in an emergency. The assistance of experts may be sought for developing inland water transport in this area.

32.6 **Madras.**—The Buckingham Canal carries mainly shells, rice, fire-wood and salt. None of these commodities enter into the trade passing through this Port. Commodities like iron ore, mica and tobacco, which originate in the vicinity of the North Canal Zone do not move by the Canal. The Port of Madras is mainly designed to provide facilities for handling cargo moved by rail transport or brought from the godowns of the shipping agents within the city. There is considerable congestion in the Port area and the Port authorities are not in favour of any connection with the Buckingham Canal. In the circumstances we do not feel inland water transport has any great part to play in connection with this Port, Madras Harbour.

32.7 **Cochin.**—There are great possibilities of increased utilisation of inland water transport for handling exports and imports passing through this Port. Details have already been mentioned in Chapter V. The State Government should work out necessary schemes with the help of expert technical staff for improvement of the waterways leading to the Port.

32.8 **Paradip.**—This Port has been declared a minor Port and is already exporting iron ore from Sukinda mines. The waterways leading to it serve a region completely devoid of rail communications. We are impressed with the necessity of development of these waterways and co-ordinated planning of transport facilities for increased movement of commodities, like iron ore, in bulk.

32.9 **Other Ports.**—There are possibilities of greater utilisation of inland water transport at various other Ports. We have given whatever information is available on the subject in preceding Chapters. The State Governments concerned may work out detailed schemes for development of waterways leading to the ports and prepare estimates of cost and time needed for their execution.

32.10 We may add that the detailed hydrological and other investigations and traffic surveys recommended by us will result in collection of further information. On the basis of this data, it should be possible to work up schemes for increased utilisation of inland water transport for export and import of goods from the various ports as also for inland traffic.

32.11. With the discovery of ore deposits by the Geological Survey of India and the efforts of the State Trading Corporation to step up export of ores, there may be considerable scope for movement of ores from the mines to Ports for export or to centres of industries for processing. Possibilities of utilisation of water transport for the above purposes should be examined.

32.12. The possibility of locating new industries on waterways with a view to utilisation of water transport should also be kept in view.

33. Our third Term of Reference reads as follows:—

“To examine the prospects of increasing and extending the river and canal services, including a direct service on the East Coast as well as from some point in the North to the South and to suggest steps to be taken to achieve effective co-ordination between the railways and inland waterways including financial participation, appropriate allocation of traffic as between the two modes of transport and arrangements for through-booking.”

The waterways of the country and traffic thereon have been deteriorating for some time. Even during the last two years since our Committee was formed, a decline in the activities over waterways like the Ganga and Ghagra has occurred. The main reasons for this progressive deterioration are—

- (a) increasing need for utilising water primarily for irrigation;
- (b) inadequate attention paid to the maintenance of waterways;
- (c) policy of endeavouring to recover initial capital outlay and maintenance costs through tolls which traffic has been unable to bear;
- (d) development of other modes of transport completely ignoring inland water transport;
- (e) absence of a Central Organisation to promote development of inland water transport on an economic basis throughout the country;
- (f) siting and developing industries away from the waterways.

33.1. The primary need is to immediately arrest further deterioration in inland water transport all over India before considering schemes to increase and extend the existing river and canal services as suggested in this Term of Reference.

33.2. That river and canal services are still holding their own in certain areas e.g., in North East India, Kerala and the Deltas of the Godavari, Mahanadi and Krishna is largely due to the fact that it is costly and uneconomic to construct rail and road bridges in these areas and inland water transport is the only mode available which adjusts itself to changes in the course of rivers.

33.3. There does not appear to be sufficient justification for a direct service on the East Coast from Calcutta to Cape Comorin connecting the Orissa Coast Canal and the Mahanadi Delta Canals with the Buckingham and Vedaranyam Canals where other modes of transport, i.e., rail, road and coastal shipping are well developed. Similarly, from the data available to us we do not see adequate justification to extend the East Coast Canal system to join the West Coast Canals via Cape Comorin.

33.4. A direct service from some point in the North to the South is only possible by linking a number of rivers. Withdrawals of water for irrigation have considerably affected the navigability of the main rivers during the last century. In the absence of accurate data regarding the navigability of these rivers and detailed engineering surveys of Central India plateau through which canals have to be excavated to link up these rivers, we are not in a position to express a definite opinion on the feasibility of the scheme. We, therefore recommend that this may be examined after implementation of the various multipurpose projects during the next 30 years which will, no doubt, make the rivers navigable to a much greater extent than at present.

33.5. We next turn to the question of steps to be taken to achieve effective co-ordination between the Railways and inland waterways including financial participation, proper allocation of traffic and arrangements for through-booking. We have indicated in Chapter IX the Governmental Organisation necessary for developing inland water transport. Co-ordination is essential and has to be effected between (a) various Ministries of the Central Government; (b) the Advisory Committee of the Central Government; (c) private and public sectors and (d) all the modes of transport. We suggest that in order to achieve co-ordination of all modes of transport, the head of the inland water transport Organisation in the Ministry of Transport and Communications be appointed a member of the Central Transport Co-ordination Committee.

33.6. We are glad to note that a good deal of co-ordination already exists between the Railways and inland water transport where the latter is well organised as in North-East India. The Railways and the Joint Steamer Companies have through booking arrangements. We suggest that similar facilities for through booking arrangements be extended to other well established and organised inland water transport undertakings in all regions.

33.7. Another means of co-ordination is the allocation of traffic between the various modes of transport. Conditions vary greatly not only from region to region but also from time to time. The pattern of trade is also subject to changes. It is not possible to lay down any general formula but each case has to be separately considered on merits. We, therefore, suggest that machinery be set up in each region to make allocations from time to time on quick appraisal of the situation bearing in mind the relative suitability of various modes of transport. This machinery should be on a regional basis with representatives of the State Governments, Railways, Road and Inland Water Transport operators and trade and commerce who are directly concerned.

33.8. In the present under-developed state of inland water transport in the country, we do not envisage financial participation by the railways.

34. Our fourth Term of Reference reads as follows—

“To consider the organisation of an efficient country boat service on a co-operative basis with an appreciable increase in the present number with a view to facilitating the carriage of more goods and the question of mechanising at least some of the boats, with particular reference to cost, time and other implications.”

We made careful enquiries during the course of our tours but failed to discover any country boat service run on a co-operative basis. There are, however, a few Fishermen's Co-operative Societies in existence in different parts of India.

34.1. Needless to say, in these days of fast mechanised transport when everybody is getting speed minded and time means money, a slow moving country boat has little or no chance of survival. There has been considerable decline in the number of country boats and their operations all over India. Traders are unwilling to entrust their goods to individual boatmen, who take days to reach their destination with consequent risk of loss due to pilferage, weather and so on. We, therefore, consider it absolutely essential that boatmen should be organised into Co-operative Societies with proper encouragement and other facilities given by Government. It is only a strong Co-operative Organisation which might be able to provide facilities and conveniences which are beyond the reach and capacity of individual boatmen and win the confidence of the trading community and secure a steady flow of traffic to enable the organisation to run efficient country boat services on any river or canal system in India.

34.2. Along with organisation of country boats into co-operatives, Government will have to make some arrangements for allocating traffic to such co-operatives even at some cost and inconvenience to themselves. We found for instance that in one State in spite of Steamer services having ceased to operate and in spite of country boats lying idle, the movement of grain on government account was entrusted to other agencies and not a single order to move grain was given to country boats. It is futile to expect country boat services to flourish if Government themselves do not patronise them.

34.3. Regarding the question of mechanising at least some of the boats, the carrying capacity of country boats is already low and the installation of machinery would further reduce the capacity and make country boat services utterly uneconomical. Some types of country boats do not easily lend themselves to mechanisation. The average boatman is not capable of operating and maintaining marine engines. We are, therefore, not in favour of mechanisation of country boats except to the extent of providing tugs to tow them in waterways with strong current or in tidal waters where such facilities are likely to increase their turn-round and efficiency without loss of

stowage capacity. Naturally, it will be impossible to provide tugs for every individual boatman. What could be done is to provide tugs to boatmen's co-operatives or other organisations which could be made responsible for the operation and maintenance of the craft and for proper precautions to be taken to avoid accidents in course of towing operations. We suggest that this should be further investigated more fully by the expert technical staff we have recommended "with particular reference to cost, time and other implications".

35. Our fifth Term of Reference requires us—

"to suggest whether any special organisation is necessary to execute the schemes and how they should be financed."

The question of how schemes should be executed and financed will arise only after schemes have been drawn up and approved for execution. We have so far come across few schemes of this nature. What we have actually encountered is a number of ideas which require further investigation before they can be worked up into project reports for execution and provision of funds. A list of all such ideas together with approximate estimates of cost, based more or less on guess work, has been included as Appendix No. IV of this report. This is based on ideas put forward by the State Governments as well as what came to our notice from various other sources in course of our tours. It is possible that some of the items may prove impracticable. It is also possible that other and better ideas may suggest themselves in course of detailed investigations. All this work will have to be done primarily by the technical staff in each one of the States principally interested in inland water transport. The project reports prepared by the State Governments will then have to be checked up by the two technical organisations which we have recommended to be set up in the Ministry of Transport and Communications and in the Central Water and Power Commission. It is only these organisations which will enable the Ministry of Transport to implement the undertaking which they have given on recommendation No. 2, Paragraph 23 of the Estimates Committee Report that the Ministry of Transport will now accept the responsibility of co-ordinating and developing inland water transport.

35.1. While considering the question of planning and preparation of project reports for the development of inland waterways, it might be relevant to consider the analogy of the national highways. The construction of a national highway is a comparatively easy task which can be undertaken by the Public Works Department of the State Governments once the plans have been formulated and the necessary finance provided by the Central Government. It is the planning part of the work which requires the greatest care and attention. A national highway planned without reference to important towns and centres of population and industry might become an excellent roadway but would be of little or no use if there is little traffic on it. Similarly, canals, rivers and waterways have also to be justified from the traffic point of view and not merely from the point of view of availability of water and levels in certain areas.

35.2 We, therefore, feel that while the execution of schemes for inland water transport could well be left to the Irrigation Departments of the State Governments, special technical organisations are absolutely necessary both under the State and the Central Governments to plan the schemes and make sure that the waterways, when constructed, do not merely become ornaments and fall into disuse, but become live arteries of trade and commerce and supplement other modes of transport to remove bottlenecks likely to be created as a result of the Third and subsequent Five Year Plans.

35.3 The financing of all such schemes, needless to say, will have to be done by the Central Government for the next 10 years when the position may again be reviewed in the light of conditions then existing in the country. At present the State Governments do not have any surplus funds. If they are asked to contribute from their own resources towards the development of inland water transport, the possibility of any funds being made available will be remote. The States would rather clamour for new Railway lines etc., to be financed by the Centre than find money for inland water transport. The question of contribution by the States could, of course, be reconsidered after ten years in the light of developments.

36. Our last Term of Reference is—

“To make recommendations regarding important water-ways to be declared as National Waterways as envisaged in the Constitution.”

The Estimates Committee in their Sixty-first report on Inland Water Transport had recommended that—

- (a) the question of declaring important waterways as National Waterways should be taken up;
- (b) a beginning may be made with the Ganga and the Brahmaputra waterways; and
- (c) the Inland Water Transport Committee may be asked to go into the question of expenditure involved in declaring other important waterways in the country as National Waterways and to prepare a scheme for gradual increase in the mileage of waterways to be declared as National Waterways.

36.1 During the course of our enquiry, there was a general demand from the State Governments and non-official organisations that the important waterways in their particular regions should be declared as National Waterways, thereby shifting the responsibility for conservancy and maintenance of these waterways and for development of inland water transport from the State Governments concerned to the Government of India.

36.2 The Constitutional position is that when an inland waterway is declared by Parliament by law to be a National Waterway, Parliament alone has the power to legislate with regard to shipping

and navigation and carriage of passengers and goods in mechanically propelled vessels and the rule of the road on that waterway (vide entries 24 and 30 in List I). The executive power of the Central Government is co-extensive with this Legislative power of Parliament as provided in Article 73 of the Constitution.

36.3 Although the ownership of the waters of the National Waterway will continue to vest in one or the other State, the Central Government would still have the right and the consequent and co-relative liability over that Waterway for the limited purpose envisaged in entries 24 and 30 in the List I of the Seventh Schedule to the Constitution of India. It would, therefore, be the Central Government's responsibility to maintain the National Waterway so far as such maintenance related to shipping and navigation as regards mechanically propelled vessels. It would also appear to be the right and responsibility of the Centre to take the measures indicated below:—

- (a) Hydrographic surveys and enforcement of draft restrictions according to the availability of seasonal depths.
- (b) Day to day conservancy measures such as (i) bandalling; (ii) dredging; (iii) marking of channel for day and night navigation.
- (c) Salvage operations such as removal of wrecks and snags constituting a danger to navigation.
- (d) Enforcement of Rules of the Road and assistance in the event of groundings or collision.
- (e) River training measures of a permanent nature involving capital expenditure.

36.4 It would further appear that in respect of a National Waterway, a State Government might not have the right to divert water from that waterway for irrigation purposes so as to prejudice shipping and navigation therein by mechanically propelled vessels contrary to the provision of any Central Act in that behalf.

36.5 We have given anxious thought to the whole question and feel that it is desirable to suggest certain principles on the basis of which it may be examined whether any particular waterway should be considered for being declared as a National Waterway, bearing in mind the legal and financial implications involved. We suggest the following principles for consideration:—

- (a) That the Waterway should pass through and serve the interests of more than one State in India;
- (b) That the waterway should have on it, a substantial amount of traffic by mechanically propelled vessels; and
- (c) That the Government of India should be satisfied that it will not be possible for the State Governments concerned to undertake proper regulation and development of such Waterway and that it should, therefore, be virtually taken over by the Government of India in the national interest.

36.6 In the light of the above, we doubt if any of the waterways except the one connecting Calcutta with Assam needs further consideration. Even this waterway is not continuous and passes through several hundred miles of Pakistan territory. We feel that the declaration of this waterway as a National Waterway is likely to introduce complications which would be expedient to avoid at present. In the circumstances, we do not recommend any of the waterways in India to be declared as a National Waterway at this stage.

36.7 At the same time, we would strongly urge that the Government of India should assume responsibility for improving and maintaining all important waterways of the country, including more particularly those suggested for early development in our report.

36.8 We are unable to go into the question of expenditure involved in maintaining and improving these and other waterways on the material available to us. The matter will have to be further examined by the technical staff in the light of such hydrographic and other surveys as may be necessary.



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CHAPTER XI

CONCLUSIONS AND ACKNOWLEDGMENTS

Conclusions:

37. We have now come to the end of our labours, and it is perhaps worthwhile attempting a broad outline of the results achieved even at the risk of some repetition of what has been stated in previous Chapters. This is over and above the summary of conclusions listed in Appendix V for easy reference.

37.1 Since the advent of independence in 1947, there has been keen interest in all quarters, both official and non-official, for the improvement of inland water transport in India. Some foreign experts have visited the country and made a number of suggestions. The Estimates Committee of Parliament admirably summed up the whole position and made a number of valuable recommendations in their Sixty-first Report, 1956-57. We are now adding yet another report to the list.

37.2 The fact remains that few of the recommendations have been implemented and even now we have very few concrete schemes properly investigated and ready for execution. What we have succeeded in doing is to throw up more ideas which will have to be investigated and developed in much greater detail before they can be put into the shape of schemes or project reports which can go up to the Planning Commission for sanction and provision of funds in competition with other projects relating to transport which will necessarily come up from Railways, Road Transport and other agencies.

37.3 The real weakness of the situation lies in the almost complete absence of expert technical organisation conversant with and having practical experience of the various complexities of inland water transport, both in the Government of India and in the State Governments mainly interested, e.g. Assam, Bengal, Orissa, Andhra Pradesh, Kerala and Bombay. Inland water transport has made great advances in several countries of Europe and in America because, it is in the hands of experts having practical knowledge of its working and conversant with the scientific and technological advance made in this field in recent years.

37.4 Inland water transport has suffered from neglect for the last 100 years. Even during the course of our investigations, we have seen some river and canal services gradually coming to a standstill. Their revival will not be an easy task. It is futile to expect to attain this objective without the help of experts who are not only conversant with the latest developments in inland water transport in progressive countries of the world, but are also familiar with the problems and requirements of our country.

37.5 While the actual execution of inland water transport projects may be left to State Governments who are in the best position to supervise the work, investigations and planning, co-ordination and overall control as well as the financing of inland water transport projects must be undertaken by the Government of India, at least for the next 10 years if this industry is to be established on a firm footing, as an integral part of the transport system of the country.

37.6 We hope that another result of our investigations will be to clarify the rightful role of inland water transport and to dispel misunderstandings which were evident all over the country. Conditions have radically changed during the last 100 years since Sir Arthur Cotton proposed a net work of canals connecting the rivers. Coastal shipping, roads and railways have since been developed on which large investments have already been made. Most of the rivers than proposed to be connected are now navigable for short stretches only due to withdrawals of water for irrigation. The analogy of the Panama and Suez canals whose construction has saved shipping long detours of several thousand miles of the Don-Volga Canal which has enabled ships from the Caspian Sea, an inland sea, to reach other parts of the world, is hardly applicable to conditions in India in the present context. It might ultimately be possible to make large stretches of some of the rivers navigable by the execution of a number of multipurpose projects. It is essential that the navigational aspect should be kept in view while planning the development of the river valleys and finalising the design features of individual projects.

37.7. Our immediate objective should be to concentrate on regions where inland water transport has played an essential role and where it could continue to be so utilised by virtue of physical conditions and natural resources already available. We were particularly impressed with the immediate necessity for the maintenance and development of the following:—

- (a) Water transport route between Calcutta and North-East India including North Bengal, Assam and Cachar Valleys.
- (b) Water transport route between Calcutta and upper India including Sunderbans, Bihar and Uttar Pradesh.
- (c) The creeks and rivers round Bombay and Salsette islands.
- (d) The backwaters and canals of Kerala.
- (e) The Delta Canal system of the Mahanadi leading to the Port of Paradip.
- (f) The Krishna and Godavari rivers and their Delta Canals.
- (g) Coastal Canal linking backwaters along the Mysore Coast.
- (h) The Narbada, Tapti and Vasisthi rivers in Bombay State.

- (i) New canals which have come into existence as a result of multi-purpose river valley developments.
- (j) Ferry services over all the waterways and reservoirs of multi-purpose dams.
- (k) Kashmir valley where inland water transport has a part to play in attracting tourists.
- (l) Buckingham and Vedaranyam Canals. (The traffic potential as revealed by the traffic survey, is not encouraging for large scale improvements. It is, however, necessary to restore these canals to their original condition and maintain them.)

37.8 While country craft have figured prominently over the waterways and will doubtless continue to do so in shallow stretches of our waterways, modern mechanised craft designed to suit the waterways, are essential for bulk movement of commodities over long distances. With efficiently, maintained waterways and craft inland water transport can develop to be not only the cheapest of form of transport but also the quickest mode for lifting considerable bulk quantities between any two places. It is therefore essential to contemplate sustained improvement of our waterways with a view to improving their classification. This can be achieved by a phased development programme with capital investment in gradual stages as and when traffic develops.

37.9 As stated earlier, it has not been possible for us to recommend specific projects for execution and say what they will cost. We have been able to collect additional ideas over and above those previously given by Estimates Committee of Parliament in their Sixty-first Report. These ideas will have to be worked up by expert technical staff before they can possibly assume necessary shape for consideration by the Planning Commission and provision of funds. We would, however, like to submit that the provision of Rs. 1 crore 42 lakhs for inland water transport in the Second Five Year Plan is in our opinion a mere flea bite. We strongly recommend that a serious beginning should be made to rehabilitate inland water transport in India during the Third Five Year Plan period, and that a provision of at least 50 crores should be made to ensure some appreciable advance.

37.10 In recommending a minimum provision of Rs. 50 crores for inland water transport in the Third Five Year Plan, we do not mean to suggest that the various schemes in view would cost only Rs. 50 crores. These schemes would easily cost several times that amount. But we recommend a provision of only Rs. 50 crores, because we feel that anything more is not likely to be utilised during the Third Five Year Plan period considering that the necessary technical staff has to be recruited, further investigations taken in hand and specific project reports prepared for consideration and provision of funds.

37.11 We are leaving plenty of scope for initiative to be taken by the various States inasmuch as we do not recommend apportionment of the sum of Rs. 50 crores amongst different States whether

APPENDIX I

(Vide para 3·9 Chapter II)

INLAND WATER TRANSPORT COMMITTEE

GOVERNMENT OF INDIA

MINISTRY OF TRANSPORT AND COMMUNICATIONS

(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,

Calcutta, May 12, 1958

No. IWT-EC-4(2)/57/1.

To,

The Secretary to the Government of India,
Ministry of Transport and Communications,
Department of Transport,
New Delhi.

SUBJECT:—*Committee on Inland Water Transport—interim Recommendation.*

Sir,

I am directed to invite a reference to Government of India Resolution No. 3-IWT(44)/56 dated the 18th February, 1957, setting up a Committee on Inland Water Transport.

2. The Committee started their work in May, 1957, after the appointment of Shri S. P. Sarathy as part-time Secretary. The first meeting was held at Poona on 3rd and 4th June, 1957, when general discussions took place and a programme of work was chalked out. We have since visited various inland waterways in Andhra Pradesh and Madras from the 1st to 12th August, 1957 and 3rd and 4th January, 1958; in Orissa from the 6th to 12th January, 1958; and in Mysore and Kerala from the 31st January, 1958 to 10th February, 1958. At all these places, the Committee met the Honourable Ministers, concerned officials and non-officials as well as representatives of trade, commerce and I.W.T. interests. A meeting of the Committee was held in Delhi from 2nd to 5th September, 1957, when the Master Plan drawn up by the Central Water and Power Commission was examined. The most recent meeting of the Committee was also held at Delhi from 7th to 9th April, 1958. At both these meetings various officials and non-officials including members of the Estimates Committee of Parliament were interviewed. And, finally, the material gathered so far was discussed and the future programme of work chalked out as far as possible.

3. Although inland water transport is of most vital importance in North East India, the Committee have not so far been able to visit that area. Some of the short terms problems concerning inland water transport in Bihar which impinge on connected problems in other States of North East India, are under the consideration of a separate Committee under the chairmanship of Shri R. K. Mitra, Chairman, Calcutta Port Commissioners. Our Committee felt that they should await Shri R. K. Mitra's final report before visiting North East India. Meanwhile, however, they have suggested a traffic survey being carried out in that area and our Secretary has been in touch with the Governments concerned and given them an idea of the material we would like them to collect for our consideration. The Committee has provisionally programmed to visit North East India in October and November, 1958. We also hope to visit some parts of Bombay State towards the end of this year. By that time, we hope that we may be in a position to collect necessary data, finalise our recommendations and write out our report.

4. Unfortunately, the material collected so far is very poor and utterly inadequate for a proper consideration of our Terms of Reference. This is hardly a matter of surprise considering the almost complete absence of technical staff at the disposal of the Government of India and the Governments of the States concerned. The Development Advisor and Joint Secretary of the Ministry of Transport and Communications, who is one of our members, has got absolutely no technical staff at his disposal. The navigation wing of the Central Water and Power Commission under the Ministry of Irrigation and Power has only got one or two officers in charge, with little or no technical staff to collect and collate necessary hydrographical and other data which is essential for proper consideration of inland water transport problems in various parts of India. The State Governments have only got their Chief Engineers-in-charge of irrigation who are busy with irrigation and have little or no practical experience of navigational requirements. They are naturally inclined to treat the navigational aspect, for which they have no time, with scant courtesy.

5. There is nobody in India on the Transport side whose duty it is to take a comprehensive view of various modes of transport and consider how best they should be co-ordinated to serve the ever increasingly complex problems created by our Five Year Plans. Transport Commissioners under State Governments are only interested in transport of passengers on the main roads. They have neither the technical staff nor the know-how to devote to a consideration of inland water transport. Except in Kerala, State Governments do not even run ferries which might have at least given them some idea of the complexities involved in inland water transport services. Local bodies expect ignorant contractors to run ferries with consequent overloading and lack of maintenance and repairs, resulting in loss of life in the ever increasing boat accidents in recent years. The Railways, which run some excellent ferry services, now seem more inclined to curtail such services rather than extend them for the benefit of the travelling public. Unlike other countries, Port Trusts and Municipal Corporations in India take little or no interest in

development of Inland Water Transport, running ferry services or making people as a whole water minded or interested in adequate sports.

6. No traffic surveys have so far been undertaken anywhere in India to ascertain the actual amount of traffic by inland water transport and other modes of transport, and collect statistics of boats, boatmen and so on. The occurrence of bottlenecks which could be effectively tackled by increased utilisation of inland water transport is apparently nobody's business.

7. There have been a number of reports on inland water transport during the last ten years since the attainment of our independence. But very few of the recommendations have been implemented and meanwhile inland water transport is actually receiving a set back all over India due to lack of dredging and maintenance of existing waterways and canals and general apathy which again is largely due to the absence of any technical staff conversant with the real problems of inland water transport.

8. In the circumstances, we are not yet in a position to draft even an interim report on the various terms of reference which have been given to us. At the same time, the Committee feel that it would be a great pity if the meagre provision for the development of inland water transport contemplated under the Second Five Year Plan is allowed to lapse owing to delay in submission of our report. The Committee also feel that some of their difficulties should be immediately placed before Government for their consideration so as to facilitate the further working of the Committee during the next cold weather. Against this background, the Committee have asked me to submit five specific sets of recommendations for the urgent consideration of Government. I am accordingly following up this communication with five separate letters on the subject noted below:—

- (i) Immediate improvements to the existing inland waterways in North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras.
- (ii) Immediate traffic surveys in the States of North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras.
- (iii) Immediate investigations by Central Water and Power Commission for obtaining hydrographical data of selected rivers in certain reaches capable of early development.
- (iv) Multipurpose river valley project reservoirs, Rajasthan Canal and other canals with possibilities of developing I.W.T.
- (v) Setting up of technical wings in the Ministry of Transport and Communications and the Central Water and Power Commission under the Ministry of Irrigation and Power.

We have advisedly made each letter separate and self contained to avoid delays which might occur if several recommendations are grouped together.

9. The estimated cost of our various recommendations would be roughly as follows:—

	Rupees (in lakhs)
(i) Immediate improvements to the existing inland waterways in North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras	270
(ii) Immediate traffic surveys in the States of North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras Say.	3
(iii) Immediate investigations by Central Water and Power Commission for obtaining hydrographical data of selected rivers in certain reaches capable of early development Say.	7
(iv) Multipurpose river valley project reservoirs, Rajasthan Canal and other canals with possibilities of developing I.W.T.	(Provision should be made for the expenditure involved in the respective project reports.)
(v) Setting up of technical wings in the Ministry of Transport & Communications and the Central Water & Power Commission under the Ministry of Irrigation and Power Say.	12
	<hr/> 292 <hr/>

The provision for inland water transport in the Second Five Year Plan is as follows:—

	Rs. (in lakhs)
(i) North East India	142
(ii) Kerala	43
(iii) Buckingham Canal	115
	<hr/> 300 <hr/>

Our recommendations are thus well within the provision made in the Plan.

10. I am to request that these recommendations may kindly receive favourable consideration at an early date. The Inland Water Transport Committee particularly wish me to stress the importance of undertaking immediate traffic surveys in various areas and even more so, the other most important question of setting up immediately two technical wings in the Ministry of Transport and Communications and the Central Water and Power Commission. Both these recommendations, if implemented, will help the Committee to deal more effectively with their Terms of Reference during the ensuing cold weather.

11. I am to add that all the members of the Committee are part-time and the expenditure involved is mostly on Travelling Allowance whenever the Committee undertake any tour. The virtual postponement of our work till the next cold weather should not, therefore, appreciably add to the cost.

12. To facilitate early consideration of our recommendations, I enclose therewith five spare copies of this letter for the use of the Planning Commission, the Ministries of Irrigation & Power and Finance, the Chairman, Central Water and Power Commission and Shri H. P. Mathrani, I. S. E. (Retd.), Development Advisor and Joint Secretary to the Government of India, Ministry of Transport & Communications, New Delhi.

Yours faithfully,
S. P. SARATHY,
Secretary.

INLAND WATER TRANSPORT COMMITTEE
GOVERNMENT OF INDIA
MINISTRY OF TRANSPORT & COMMUNICATIONS
(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,
Calcutta, May 12, 1958.

No: IWT-EC-4(2)/57/2.

To.

The Secretary to the Government of India,
Ministry of Transport and Communications,
Transport Department,
New Delhi.

SUBJECT:—*Immediate Improvements to the existing Inland Waterways in North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras.*

Sir,

I am directed to invite a reference to paragraph 8 of my letter No. IWT-EC-4(2)/57/1 dated 12th May, 1958, about interim recommendations by the Committee on Inland Water Transport.

2. The Inland Water Transport Committee visited the waterways of Andhra Pradesh, Madras, Orissa, Mysore and Kerala between July 1957 and February 1958 and discussed various development schemes with the concerned officers of the State Governments and the public interested in the subject. The Committee have not yet visited North East India. But some of our members have intimate knowledge of the waterways in that area. A certain amount of expenditure is contemplated under the Second Five Year Plan for the development of inland water transport in India. On a general review of the situation, the I.W.T. Committee feel that although we are not yet in a position to submit even an interim report on the various Terms of Reference, the Committee should immediately recommend to Government certain improvements to the various waterways in India with a view to utilise the provision for the development of inland water transport contemplated under the Second Five Year Plan. The Committee's recommendations in order of priority are noted below.

3. *North East India.*—Of all the waterways in India, the rivers of North East India by virtue of the largest navigable mileage and the biggest tonnage transported have carved a unique place in the country's water transport system and deserve the highest priority in the development programme. Assam, the frontier State of India in the North East Zone, is greatly dependent on inland water transport for the import and export of commodities essential to the life and economy of the community. At the present moment the railways are handling only about 35% of the total traffic and notwithstanding the improvements proposed in this plan period for strengthening and doubling the railway link in sections, about 50% of traffic requirements of Assam will still have to be met by Inland Water Transport.

A Committee under the chairmanship of Shri R. K. Mitra is already looking into the question of short term proposals for reviving inland water transport in Bihar. Our Committee feel that they should visit North East Region only after the conclusion of the investigation of the Mitra Committee; but we do not like to see urgent works in that area delayed on that account.

In view of the considerations noted above and the fact that funds to the extent of about Rs. 142 lakhs have been provided for the development of inland water transport in that area during the Second Plan, the Committee strongly recommend that immediate steps should be taken to carry out the development schemes already proposed, against the provision of Rs. 142 lakhs, during the Second Plan Period. The construction of an inland port at Pandu as well as arrangements for river conservancy and training should be given the highest priority.

4. *Orissa.*—The Committee are satisfied that the deltaic region such as the area served by the Taldanda and Kendrapara Canals and the hinterland west of the Railway line have considerable potentialities for development of water transport as here there is no clash of interest between waterways and other modes of transport. The Committee are of the opinion that in view of the importance of bulk transport of iron ores, these two waterways of Orissa should be given priority second only to the waterways of North Eastern Region in the entire country and strongly recommend that a lump-sum provision of Rs. 30 lakhs be made for developing these waterways during the present plan period. The various improvements suggested are as follows:—

- (i) The High Level Canal Range I and the Kendrapara canal should be improved to a minimum bed-width of 60' and depth of 7' at normal water level.
- (ii) The existing locks are too narrow and new locks should be constructed to a dimension of 250' × 30' to enable inland water transport to be developed to full capacity to transport the optimum quantity of ores to Paradip.
- (iii) The sides of the canal should be brick or stone lined from 3 ft. above water level to 3 ft. below water level to enable power craft to use the canal without causing erosion and bank slipping.

(iv) A minimum headroom of 16' above the highest water level should be provided under the bridges which should ultimately have two spans of not less than 30' each or one span of not less than 60'.

(v) A dredger should be provided to keep the channel upstream of the anicuts clear during the low water season and to maintain adequate depths at the off takes of the canals.

5. *Kerala*.—(i) The Committee are of the opinion that the waterways north and south of Cochin are important lines of communications for distributing the imports and exports from the Port of Cochin. They, therefore, recommend that first priority be accorded in Kerala to the improvement of the canal between Quilon and Cochin. This waterway should be improved to a minimum bed-width of 50' wherever possible and to an effective depth of 6' at normal low water. The Government of Kerala are already in possession of a few dredgers which could be utilised for this purpose and no foreign exchange is necessary.

(ii) The second priority should be accorded to the construction of two locks between Punani and Chetwai, north of Cochin. These locks will replace the earth dams which are put up by the State Government every year to hold up fresh water. All new locks in the State should be designed to a dimension of 150' x 20' x 6' to meet reasonable future requirements.

(iii) The Committee are satisfied about the need for the extension of the West Coast Canal north of Badagara upto Mahe. The canal should be designed to a bedwidth of 30' with an effective depth of 5' at low water level. In rocky portions, if any, the bedwidth may be reduced to 20'. The need for extension of this canal beyond Mahe can be considered after the detailed traffic and engineering surveys have been carried out.

(iv) The Committee have noted that a sum of Rs. 43 lakhs has already been provided during the Second Five Year Plan for the development of waterways in Kerala. The cost of the above schemes during this plan period should be met from this provision.

6. *Mysore*.—(i) The Committee are of the opinion that the coastal canal between Mangalore and Malpe will form a useful connecting link between the ports of Mangalore and Malpe in the absence of rail communication. The State Government had initially prepared a rough estimate of Rs. 27 lakhs for connecting the existing backwaters so as to form a link between these two ports from a study of the topo sheets. But, after making a reconnaissance and after allowing certain improvements with regard to dimensions etc., the State Government have now revised the estimate to Rs. 70 lakhs.

(ii) The Committee feel that this canal link will form a useful waterway. As there is no provision in the Second Five Year Plan for this region, the Committee recommend a token provision of Rs. 10 lakhs during the Second Five Year Plan period.

(iii) The Committee would not like to express any opinion on the proposals for extending the canal beyond Malpe upto Karwar and south of Mangalore to connect it with Hosdrug in Kerala till the engineering and traffic surveys which the State Government have been asked to undertake have been completed.

7. *Madras and Andhra Pradesh*.—(i) In order to assess the improvements required to cater for the traffic likely to be carried on the Buckingham canal, a traffic survey, of the Buckingham canal and the Vedaranyam canal, area has been suggested and is in progress.

(ii) Pending the receipt of the traffic survey report, the Committee are of the view that experimental dredging should be carried out in the Buckingham canal by Madras and Andhra Pradesh Governments to see whether the canal bed when deepened would not heave up again almost immediately to its pre-dredged level as was reported to have happened earlier when the bed was deepened manually. It is, therefore, recommended that experimental dredging upto a depth of 6' should be carried out in Andhra Pradesh from mile 179 to mile 181 between Kothapatnam and Mudigundi river or in some other reach where this problem is acute. A similar vulnerable stretch in the Madras State may also be selected for similar experimental dredging. For this purpose the two State Governments should each acquire a dredger. The expenditure involved on this account as also for other minor improvements to the Buckingham canal north of Madras might be of the order of say Rs. 30 lakhs in Andhra Pradesh and Rs. 15 lakhs in Madras during the present plan period. No improvements are being suggested for the Vedaranyam canal during the Second Five Year Plan.

(iii) The Committee have noted with concern that country boats are being detained unnecessarily at the Madras and Hood wharfs for recovery of demurrage on goods till the goods are cleared from the wharf by the consignee, unless the Boatmen's Association undertakes the responsibility to pay off the dues. It is understood that this practice is being followed in the absence of a compound wall and warehousing facilities and watch and ward staff at these wharves. The Committee strongly recommend that terminal facilities such as warehouses with proper compound walls should be provided to ensure the security of goods and to prevent unnecessary detention of boats pending realisation of dues.

8. To summarise our recommendations, the following expenditure is recommended for inland water transport during the remaining years of the 2nd Five Year Plan period, arranged in order of priority:—

	Rupees (in lakhs)
North East India	142
Orissa	30
Kerala	43
Mysore	10
Andhra Pradesh	Say 30
Madras	Say 15
TOTAL	270

We are not suggesting any change in the allotment for inland water transport in the current Five Year Plan for North East India and Kerala. We suggest new provision of Rs. 30 lakhs for Orissa and

Rs. 10 lakhs for Mysore in view of the importance of those areas and the possibility of earning foreign exchange by these improvements. For the Buckingham canal in Andhra Pradesh and Madras there is a provision of Rs. 115 lakhs. Unfortunately this canal only carries firewood, salt, shell and some other miscellaneous goods. There is no possibility of earning foreign exchange on this canal. On the 6' should be carried out in Andhra Pradesh from mile 179 to mile 181 6 (ii) above will necessitate the purchase or construction of dredgers which need foreign exchange. Perhaps the two State Governments may be able to furnish additional justification for foreign exchange for manufacture or purchase of such dredgers.

The saving of Rs. 70 lakhs from the provision under Buckingham Canal may be utilised to provide Rs. 30 lakhs for Orissa and Rs. 10 lakhs for Mysore. The balance of Rs. 30 lakhs should be available for the implementation of our other recommendations as stated in para 8 of our letter No. IWT-EC-4(2)/57/1 dated 12th May, 1958.

9. To facilitate early consideration of our recommendations, I enclose herewith five spare copies of this letter for the use of the Planning Commission, the Ministries of Irrigation & Power and Finance, the Chairman, Central Water and Power Commission and Shri H. P. Mathrani, I.S.E. (Retd.), Development Advisor and Joint Secretary to the Government of India, Ministry of Transport and Communications, New Delhi.

Yours faithfully,
S. P. SARATHY,
Secretary.

TELEGRAMS: "SARATHY PORTCULLIS"
INLAND WATER TRANSPORT COMMITTEE
GOVERNMENT OF INDIA
MINISTRY OF TRANSPORT & COMMUNICATIONS
(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,
Calcutta, May 12th, 1958.

No. IWT-EC-4(2)/57/3.

To

The Secretary to the Government of India,
Ministry of Transport and Communications,
Transport Department,
New Delhi.

SUBJECT:—*Immediate traffic surveys in the States of North East India, Orissa, Kerala, Mysore, Andhra Pradesh and Madras.*

Sir,

I am directed to refer to this office letter No. IWT-EC-1(35)/57, dated 17th January, 1958 and to say that pending finalisation of their recommendations with regard to the development of inland water

transport in India, the Inland Water Transport Committee desire that regular traffic surveys should be carried out in the areas served by the following waterways, as early as possible:--

- (i) Waterways of North East Region.
- (ii) Waterways of Orissa.
- (iii) Waterways of Kerala.
- (iv) Waterways of Mysore.
- (v) The Buckingham and Vedaranyam canals of Madras and Andhra Pradesh.

2. We have discussed the matter with the parties concerned during our meetings and visits to various places. We suggested to the Mitra Committee to undertake a traffic survey in the whole of the North East Region so that the results might be available both to the Mitra Committee and to our Committee before the end of this year. It is understood that the proposal for traffic survey is now under your consideration. I am to request that the selection of a suitable officer to carry out the traffic survey may kindly be expedited, so that the traffic survey results may be available to our Committee before the end of this year. I may add that the Government of Assam who have a senior Railway Officer on deputation to advise them on transport have separately been requested by us to have a traffic survey of the Assam region undertaken under his guidance.

3. The Chief Minister of Orissa agreed during our visit to Bhubaneswar to have the traffic survey in that area undertaken at the cost of the Orissa Government. In consultation with the Government of Orissa and the South Eastern Railway, Shri A. S. Rajagopalan, a retired officer of that Railway has been recommended to the State Government during the Committee's visit to that area and the State Government agreed to appoint him. I hope the matter will now be energetically pursued and the results made available to us as early as possible.

4. The Government of Kerala similarly agreed during our visit to have the traffic survey in that area undertaken at their cost. The matter was discussed with the Southern Railway and Shri N. V. Vaidyanatha Iyer, a retired Deputy Chief Commercial Superintendent, Southern Railway, who recently studied the transport problems in Bihar on behalf of the National Council of Applied Economic Research was considered suitable and the Government of Kerala has been informed accordingly.

5. No arrangements have yet been made for traffic survey in the Mysore area on the West Coast of India. It would seem feasible

to have the traffic survey in that area conducted by Shri N. V. Vaidyanatha Iyer who has been recommended to undertake the traffic survey in Kerala. I propose to write to Mysore Government conveying this suggestion.

6. Shri T. K. Sundarajan, a retired officer of the ex-South Indian Railway, has already been appointed to undertake a traffic survey of the Buckingham canal and Vedarnyam canal area. The expenditure involved is being met by the Government of India.

7. All these traffic surveys whether undertaken by the Government of India or the State Governments should be under the overall control of the Ministry of Transport and Communications and should be conducted in close co-operation with the Central Ministry of Railways and the Transport Commissioners under State Governments. The details to be collected during these surveys and the method of collecting them should be carefully worked out by the Development Adviser and Joint Secretary to the Ministry of Transport and Communications in consultation with the local Railway administration and Commissioners of Transport. This has already been done to some extent. But continuous watch and supervision is necessary if the traffic survey figures are to be of any real use. It would be well worth while incurring a total expenditure of about Rs. 3 lakhs on these surveys during 1958-59.

8. The I.W.T. Committee would be most grateful to the Government of India for their assistance in expediting all these traffic surveys so that the results may be available to us for consideration during the ensuing cold weather. An early communication from the Government of India to the various State Governments concerned will serve to expedite the work.

9. This letter may kindly be read against the background as stated in my letter No. IWT-EC-4(2)/57/1, dated 12th May, 1958 (copy enclosed) with special reference to paragraph 8 of that letter.

10. To facilitate early consideration of our recommendations, I enclose herewith five spare copies of this letter for the use of the Planning Commission, the Ministries of Irrigation & Power and Finance, the Chairman, Central Water & Power Commission and Shri H. P. Mathrani, I.S.E. (Retd.), Development Adviser and Joint Secretary to the Government of India, Ministry of Transport and Communications, New Delhi.

Yours faithfully,
S. P. SARATHY,
Secretary.

TELEGRAMS: "SARATHY PORTCULLIS"

INLAND WATER TRANSPORT COMMITTEE
GOVERNMENT OF INDIA
MINISTRY OF TRANSPORT & COMMUNICATIONS
(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,
Calcutta, May 12th, 1958.

No. IWT-EC-4(2)/57/4.

To

The Secretary to the Government of India,
Ministry of Transport and Communications,
Transport Department,
New Delhi.

SUBJECT:—*Immediate investigations by Central Water & Power Commission for obtaining Hydro-Graphical and other data for selected rivers in certain reaches capable of early development for purposes of inland water transport.*

Sir,

I am directed to invite a reference to paragraph 8 of my letter No. IWT-EC-4(2)/57/1, dated 12th May, 1958 (copy enclosed) about interim recommendations by the Committee on Inland Water Transport.

2. The Committee on Inland Water Transport have examined the Master Plan prepared by the Central Water & Power Commission. This plan envisages linking up various major rivers of India, e.g., the Narmada with the Ganga; the Ganga with the Mahanadi; the Tapti with the Godavari and so on. The idea is to provide navigational links all over India from east to west and north to south. The Central Water & Power Commission had also prepared an estimate amounting to about Rs. 9 lakhs for preliminary investigation of some of the major items in the Master Plan and the Committee on Inland Water Transport were unofficially asked to express their views about this estimate.

3. The Chairman of the Central Water & Power Commission, Shri Kanwar Sain, frankly told us that the scheme envisaged by the C.W. & P.C. was more in the nature of an idea than a Master Plan. The Central Water & Power Commission had developed the idea by examination of topo sheets; but a good deal of further investigation would be necessary before the idea could be developed into a plan of any kind.

4. The Members of the Inland Water Transport Committee considered the material placed before them and felt that the so-called Master Plan was at present beyond the range of practical politics. Conditions had radically altered since the time when Sir Arthur Cotton envisaged these ideas in 1874 A.D. Withdrawals of water for irrigation have considerably affected the navigability of the main rivers during the last century. Steamers which could go up to Agra in the old days now find it difficult even to go as far as Allahabad. The demand for increased food production will inevitably further

affect navigation. But, even otherwise, it would be impossible to find adequate water on the Central India Plateau to fill up any canals whether from east to west or north to south at least during six months every year. Moreover, the country had now been covered by a net-work of railways and roads and it was improbable that any considerable long distance traffic would be available by the slower navigation route when railways and road transport are available to cope more expeditiously with such traffic. In view of these and various other considerations the I.W.T. Committee found themselves unable to support the estimate of about Rs. 9 lakhs for preliminary investigations of the Master Plan as desired by the C.W. & P.C.

5. To avoid any possible misconception, however, I would like to add that a number of multipurpose projects may be constructed on various rivers during the next 30 years resulting in the rivers being made navigable to a much greater extent than at present. If, by that time, navigation has also developed on these rivers to an appreciable extent, the question may arise whether it would be worthwhile constructing a navigation canal on the hump or water shed between the two rivers. This situation is not likely to arise within our life time. (And as such we consider it to be beyond the range of practical politics).

6. To illustrate our meaning still further, scheme I of the Master Plan contemplates linking the Narmada with the Sone (a tributary of the Ganga) via the Johilla (a tributary of the Sone). The total length involved is 1230 miles, of which only 90 miles of the Narmada, from the sea up to Chandod, is at present navigable. The remaining 1140 miles is unnavigable. Our intention in suggesting further investigations by the C.W. & P.C. on the Narmada, (vide para 7 and following paragraphs below) is to find out whether any further length of the Narmada could possibly be made navigable for country craft drawing upto 3 feet at a cost commensurate with the likely traffic potential. Beyond that, we see no possibility of achieving scheme No. 1 as contemplated in the Master Plan unless and until multipurpose river valley developments on the Narmada and the Sone result in a continuous chain of waterways leaving only a gap of 10 miles which is said to be the length of the hump between the Narmada and the Johilla rivers. Be it noted that the highest point to be crossed across the hump is said to be 2600.00 R.L. The possibility of finding adequate supply of water to fill even a still water canal at this height may well nigh be doubtful.

7. It was suggested in course of discussions and agreed to by the Chairman of the C.W. & P.C. that it would be worthwhile to undertake immediate investigations on the major rivers of India from their mouths upwards to ascertain how far they could be possibly made available for navigation without prohibitive cost for minimum depths as follows:—

- | | | |
|-----|----------------------------|---|
| (a) | Stretches likely to afford | a minimum depth of 6' to 8' from the mouth inland. |
| (b) | „ „ „ | a minimum depth of 4' to 6' in continuation. |
| (c) | „ „ „ | Further minimum depth of 3' to 4' in continuation of (b) above. |

It is not worthwhile at this stage to consider stretches of rivers where even at 3 feet depth of water is not likely to be available.

8. The C.W. & P.C. have accordingly prepared estimates for immediate investigations of selected reaches of important rivers totalling up to Rs. 1.63 lakhs. These estimates were sent to the I.W.T. Committee with C.W. & P.C. letters No. X/3/N/58-WIN dated 7th March, 1958, and 25th April, 1958, with the request that funds may be made available at an early date so that investigations could be commenced during this year's low water season. The details of investigations and amounts involved are as follows:—

	Rs.
(i) Estimate for preliminary investigations of the rivers Ganga (from Kanpur to Allahabad, a distance of 155 miles) and Yamuna (Allahabad to Chambal river a distance of about 290 miles)	23,853
(ii) Estimate for preliminary investigations of the rivers Tapti (Bhusawal to Surat 232 miles) and Narmada (Hoshangabad to Broach 370 miles)	53,100
(iii) Estimate for preliminary investigations of the Orissa Coast Canal (from Geonkhali to Matai Nala, a distance of 131 miles), Matai Nala (Orissa Coast Canal to the Dhamra river 25 miles) and Mahanadi river (from Dholpur to Cuttack 167 miles)	41,862
(iv) Estimate for preliminary investigations of the Godavari (Pranhita to Dowlaishwaram anicut—260 miles)	26,700
(v) Estimate for preliminary investigations of Krishna, Sabari and Sileru rivers	18,150
TOTAL	163,665

9. Details of how the work is proposed to be done will appear from the following extract quoted from the C.W. & P.C. estimate of Rs. 53,100/- for preliminary investigations on the Tapi and Narmada.

"This will comprise preliminary hydrographical surveys of the river Tapti from Bhusawal to Surat and the river Narmada from Hoshangabad to Broach during mid-water level and low-water level of the rivers. The mid-water level survey will be carried out during the months of November or December and low-water level survey during February or March. Only one line of soundings will be recorded by drifting down of boats along the deepest channel once in each period. Discharges will also be observed during the surveys at some suitable places."

"Brief particulars regarding number and size of boats plying in the area, brief description of important riverine towns and the mode of transport that is used for transportation of goods and passengers etc., rates charged by the water transport, minimum head clearance and span or spans and location of bridges will be collected as far as possible during the survey operations by separate workcharged establishment provision for which has been made in the estimate. The estimate provides for 1 boat for each survey which will be required for taking soundings, and discharges etc. Separate provision has been made for camp shifting by boat or head load or Bullock carts. The beds of these rivers are rocky with a number of dangerous rapids and boats are, therefore, subject to damage. The hire charges of the boat in these rivers will, therefore, be comparatively higher than other rivers and the progress of work will be

less. The basis for daily hire charges at Rs. 20/- per day is indicated below:—

	Rs.
Boat hire	4/-
One Manjhi	3/8/-
5 Boatmen @ Rs. 2/8/- each	12/8/-
TOTAL	20/-/- "

"Provision has also been made for extra labour which may be required for safe crossing of the boat at a few rapids due to high velocity and sharp bends. The necessary provision for miscellaneous stores required for the survey work, hire charges of scientific instruments and tents for camping in the gorges where the boat may not be able to negotiate and survey khalasis for taking soundings etc. has been made."

10. The I.W.T. Committee feel that it is essential for development of inland water transport in India to know how far our major rivers could be made navigable from the mouth upwards with a view to encourage transport of bulk commodities to ports for the purposes of export. What we want to know is not so much the actual state of the river at various places, but the possibility of deepening channels by dredging or blasting rock and thereby increasing the length of navigable channels at a cost commensurate with the results likely to be achieved. We doubt whether the investigations as proposed by the C.W. & P.C. will really give us all the material which is necessary for a proper consideration of the problems in view.

11. In the circumstances, I am to suggest that the Ministry of Transport should be closely associated with these investigations primarily from the traffic point of view. The procedure for investigations should be carefully chalked out by C.W. & P.C. in consultation with the Development Advisor and Joint Secretary of the Ministry of Transport. The C.W. & P.C. should give us a very rough estimate of the cost of making the waterway fit for navigation. All further steps have to be considered by the Transport Ministry. The economics of the situation have obviously got to be studied. Given unlimited time and money it is possible to make any river navigable. One could also easily construct any number of canals whether from north to south or east to west. But the main question for consideration is whether the traffic potential would justify the expenditure. It will be primarily for the Transport Ministry to consider this question and to see that the investigations are conducted in a manner to achieve the objectives in view.

12. The I.W.T. Committee also feel that these investigations should not cover any canals, but should be limited to certain stretches of more important rivers as follows:—

- (i) Ganga from Allahabad to Kanpur.
- (ii) Yamuna from Allahabad to where the Chambal joins the Yamuna.

- (iii) Godavari upto the confluence of Pranhita and including Sabari.
- (iv) Mahanadi from Cuttack to Dholpur.
- (v) Narmada from the sea to the south of Hoshangabad.
- (vi) Tapti from the sea to the south of Bhusawal.
- (vii) Krishna.

We feel that an expenditure of about Rs. 7 lakhs on these investigations during the next 2 or 3 years would be amply justified. This should include the amounts likely to be required by C.W. & P.C. for their investigations as also the amount likely to be required by Transport Ministry for their part of the work. Further details should be carefully worked out by the Development Advisor and Joint Secretary of the Ministry of Transport in consultation with the C.W. & P.C.

13. I am to request that the matter may be considered at an early date in consultation with the Ministry of Irrigation and Power and the necessary investigations put in hand as early as possible.

14. To facilitate early consideration of our recommendations, I enclose herewith five spare copies of this letter for the use of the Planning Commissions, the Ministries of Irrigation and Power and Finance, the Chairman, Central Water & Power Commission and Shri H. P. Mathrani, I.S.E. (Retd.) Development Advisor and Joint Secretary to the Government of India, Ministry of Transport and Communications, New Delhi.

Yours faithfully,
S. P. SARATHY,
Secretary.

INLAND WATER TRANSPORT COMMITTEE
GOVERNMENT OF INDIA
MINISTRY OF TRANSPORT & COMMUNICATIONS
(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,
Calcutta, 12th May, 1958.

No. IWT-EC-4(2)/57/5.

To

The Secretary to the Government of India,
Ministry of Transport and Communications,
Department of Transport,
New Delhi.

SUBJECT:—*Multipurpose River Valley Project Reservoirs, Rajasthan Canal and other canals with possibilities of developing inland water transport.*

Sir,

I am directed to invite a reference to paragraph 8 of my letter No. IWT-EC-4(2)/57/1 dated 12th May, 1958 about interim recommendations by the Committee on Inland Water Transport.

2. The I.W.T. Committee have enquired about some of the multipurpose projects in hand, and are surprised to find that the navigation aspect appears to have been lost sight of in some cases. For instance, the elementary precaution of cutting down trees in the bed of the reservoir has not been taken either at Hirakud or Tungabhadra Dam with the result that these excellent man-made lakes with spread of nearly 300 and 150 miles are not available for safe navigation owing to the large number of trees and branches jutting out just below the surface. Even apart from the navigational aspect these trees are a great nuisance to pisciculture which should naturally flourish in these big reservoirs.

3. No provision has been made for a lock in the dam on the Tungabhadra Project. At Hirakud, the provision for a lock has been made at a place where it is not possible to take a navigation canal from which boats may enter the reservoir. A number of multipurpose projects are likely to be taken up for execution during the next thirty years. The I.W.T. Committee feel that the navigational aspect should be prominently borne in mind as also the possibility of these man-made lakes being utilised in future by sea planes or other aeroplanes fitted with floats for landing on water. Reservoirs formed by multipurpose projects should have suitable provision for navigation locks. Trees in the bedspread area should be cut down to the root before water is allowed to enter the reservoir. The Committee further consider that as far as possible irrigation canals should be designed to cater to the needs of navigation wherever the slope permits and there is likelihood of reasonable traffic potential, at comparatively small extra cost.

4. The I.W.T. Committee were happy to learn details of the proposed Rajasthan irrigation canal taking off from Harni barrage on the Sutlej and passing through an area with meagre facilities for transport and communications. This canal with a length of 425 miles and a very gentle slope appears particularly fitted to serve as a very important artery for inland water transport. Irrigation from this canal will bring prosperity to the area and create sufficient traffic potential for inland water transport. The I.W.T. Committee, therefore, recommend that full use should be made of this canal for inland water transport. Provision should be made for large size locks to allow expeditious transport both ways. Road and Railway bridges over the canal should provide adequate headroom for navigation.

5. Similar considerations would seem to apply to the Tungabhadra Left Bank Canal which is proposed to be made navigable as also to other canals on multipurpose projects wherever there is reasonable traffic potential.

6. Needless to say, there will be a time lag between the construction of a navigation canal and its actual utilisation by country boats or other craft. The time lag between the provision of water for irrigation and its actual utilisation for growing crops is well known. Similar time lag is bound to occur on the transport side. It is, therefore, essential that in considering the question of navigational channels and canals, there must be very close cooperation and co-ordination between the Central Water and Power Commission and the Ministry of Transport at all stages right from the stage of

planning to actual construction. Such co-ordination must obviously be effected not at the administrative but at the technical level which goes further to strengthen our recommendation for the setting up of Technical Wings in the Ministry of Transport and Communications and the Central Water and Power Commission for which a separate letter is being addressed to the Ministry.

7. As soon as construction of a navigation channel or waterway is sanctioned, the Ministry of Transport will have to make arrangements in consultation with the transport authorities of the State Governments or other regional authorities like the Ganga Brahmaputra Water Transport Board to encourage the manufacture of boats, training of crews, establishment of wharfs and godowns, provision of buoys and other navigational aids, and, last but not least, watch and ward without which it becomes risky for country boats to ply at night.

8. To facilitate early consideration of our recommendations, I enclose herewith five spare copies of this letter for the use of the Planning Commission, the Ministries of Irrigation and Power and Finance, the Chairman, Central Water and Power Commission and Shri H. P. Mathrani, I.S.E. (Retd.), Development Advisor and Joint Secretary to the Government of India, Ministry of Transport and Communications, New Delhi.

Yours faithfully,
S. P. SARATHY,
Secretary.

TELEGRAMS: SARATHY
PORTCULLIS

INLAND WATER TRANSPORT COMMITTEE
GOVERNMENT OF INDIA
MINISTRY OF TRANSPORT & COMMUNICATIONS
(DEPARTMENT OF TRANSPORT)

No. 2, Portland Park,
Burdwan Road, Alipore,
Calcutta, May, 24, 1958.

No. IWT-EC-4(2)/57/6.

To

The Secretary to the Government of India,
Ministry of Transport and Communications,
Transport Department,
New Delhi.

SUBJECT.—*Setting up of Technical Wings in the Ministry of Transport and Communications and the Central Water and Power Commission under the Ministry of Irrigation and Power.*

Sir,

I am directed to refer to paragraphs 4, 8 and 10 of my letter No. IWT-EC-4(2)/57/1 dated 12th May, 1958 (copy enclosed) in which reference has been made to the utter absence of any technical staff conversant with inland water transport problems whether in the Central Water and Power Commission or with the Development

Advisor and Joint Secretary to the Ministry of Transport. The absence of such staff, both at the Centre and in the States concerned, is largely responsible for steady deterioration in the position of inland water transport all over the country. It is also responsible for the fact that our Commission has not yet been able to secure any reliable material on which we could possibly attempt adequate answers to our Terms of Reference.

2. Our fifth Term of Reference requires us "to suggest whether any special organisation is necessary to execute the schemes and how they are to be financed." It is clear that before we consider whether any special organisation is necessary to execute the schemes, there must be a competent organisation to prepare such schemes, taking into account the cost involved, the traffic potential and various other relevant considerations. This aspect was discussed by the members of the I.W.T. Committee with the Development Adviser and Joint Secretary in the Ministry of Transport and the concerned officials of the Central Water and Power Commission. The Committee have since come to the conclusion that they should immediately recommend to Government the creation of a technical organisation for I.W.T. under the Ministry of Transport and Communications and a complementary organisation in the Central Water & Power Commission under the Ministry of Irrigation and Power.

3. The main responsibility of developing inland water transport and effecting necessary co-ordination between inland water transport and other modes of transport obviously rests with the Ministry of Transport and Communications. This aspect has been rightly stressed by the Estimates Committee of Parliament in their Sixty-first Report on Inland Water Transport. The Ministry has at present no technical staff at its disposal to discharge this responsibility. It is, therefore, necessary that a technical organisation should be set up under the Ministry as early as possible with main objectives somewhat as follows:—

- (i) To study transport requirements and likely bottle-necks in the light of the Five Year Plans with a view to increasing and extending inland water transport services and their connections with major and minor ports and important centres of mining and industry;
- (ii) To undertake from time to time such traffic surveys as may be necessary.
- (iii) To study and promote modern developments in various respects such as improved designs of country boats and other craft, navigational aids, conservancy and river training, terminal facilities, tariffs, tolls and so on.
- (iv) To advise on measures for manufacture or procurement of various types of dredgers, marine engines, mechanised craft and other equipment involving the question of foreign exchange.
- (v) To draw up standards of specifications of waterways and canals, sizes of locks and clearance under bridges etc.;

- (vi) To consider the establishment of suitable training centres for training of technical staff in different kinds of work connected with inland water transport;
- (vii) To suggest steps necessary for effective co-ordination between inland water transport and other modes of transport including appropriate allocation of traffic and arrangements for through booking.
- (viii) To draw up a Master Plan for development of inland water transport with reference to
 - (a) immediate requirements during the next 30 years, and
 - (b) long term requirements.

4. The navigation potential of any river can be determined only in close co-ordination with other aspects of multipurpose river valley development. Increased withdrawals of water for irrigation, for instance, make a river less suitable for navigation. Conversely the tail discharge from any hydro-electric project improves the prospects of navigation by providing constant flow of water throughout the year. A complementary technical organisation is therefore necessary in the Central Water and Power Commission to carry out certain main objects as follows:—

- (i) To study the existing waterways and canals in India and formulate schemes for their improvement;
- (ii) To investigate proposals for extension of inland waterways, having regard to availability of water and other aspects of multi-purpose river valley developments;
- (iii) To prepare project reports, designs and estimates for waterways and canals in close co-ordination with the technical organisation under the Ministry of Transport and Communications and with concerned authorities under State Governments.

5. Inland Water Navigation is primarily the concern of the State Governments excepting navigation on inland waterways which are declared by Parliament to be National Waterways. Even these are the concern of the Union Government only in so far as mechanically propelled vessels are concerned. It is therefore essential that State Governments with bright prospects of development of inland water transport e.g. Assam, Bengal, Orissa, Kerala and Andhra Pradesh, should have their own technical organisations to help them to discharge their responsibilities. The Inland Water Transport Committee, however, decided not to make any immediate recommendations in this respect pending the setting up of technical organisations under the Ministry of Transport and Communications and the Central Water and Power Commission as recommended in the two preceding paragraphs.

6. "Tentative proposals on the lines indicated in paragraphs 3 and 4 above have since been worked by our members, Shri H. P. Mathrani and Dr. K. L. Rao. Copies of the proposals made by them are attached to this letter as appendices 'A' and 'B'. The Inland

Advisor and Joint Secretary to the Ministry of Transport. The absence of such staff, both at the Centre and in the States concerned, is largely responsible for steady deterioration in the position of inland water transport all over the country. It is also responsible for the fact that our Commission has not yet been able to secure any reliable material on which we could possibly attempt adequate answers to our Terms of Reference.

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- (i) To study transport requirements and likely bottle-necks in the light of the Five Year Plans with a view to increasing and extending inland water transport services and their connections with major and minor ports and important centres of mining and industry;
- (ii) To undertake from time to time such traffic surveys as may be necessary.
- (iii) To study and promote modern developments in various respects such as improved designs of country boats and other craft, navigational aids, conservancy and river training, terminal facilities, tariffs, tolls and so on.
- (iv) To advise on measures for manufacture or procurement of various types of dredgers, marine engines, mechanised craft and other equipment involving the question of foreign exchange.
- (v) To draw up standards of specifications of waterways and canals, sizes of locks and clearance under bridges etc.:

- (vi) To consider the establishment of suitable training centres for training of technical staff in different kinds of work connected with inland water transport;
- (vii) To suggest steps necessary for effective co-ordination between inland water transport and other modes of transport including appropriate allocation of traffic and arrangements for through booking.
- (viii) To draw up a Master Plan for development of inland water transport with reference to
 - (a) immediate requirements during the next 30 years, and
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6. "Tentative proposals on the lines indicated in paragraphs 3 and 4 above have since been worked by our members, Shri H. P. Mathrani and Dr. K. L. Rao. Copies of the proposals made by them are attached to this letter as appendices 'A' and 'B'. The Inland

Water Transport Committee have discussed these proposals in general and approve of them. I am, however, to add that these proposals have not been officially considered and put forward by the Ministry of Transport and Communications and the Central Water and Power Commission."

7. I may add that the absence of technical staff with practical experience of inland water transport has greatly added to our difficulties and made our discussions in the I.W.T. Committee on various technical matters rather academic. The Committee therefore hope that Government may be pleased to take emergent action on the recommendations contained in paragraph 3 and 4 above with a view to help the Committee with one or two really good technical experts before we consider inland water transport problems in North East India in October, 1958. In case such experts are not readily available in India, it may be possible to obtain them from ECAFE, T.C.M., or some such agency. These experts will not only be of considerable assistance to our Committee but will also help the Ministry and the Central Water and Power Commission to set up really balanced and competent technical organisations for inland water transport on a sound footing. They may also suggest details of suitable staff which may be recommended to various state Governments for their part of the work.

8. To facilitate early consideration of our recommendations, I enclose herewith five spare copies of this letter for the use of the Planning Commission, the Ministries of Irrigation and Power and Finance, the Chairman, Central Water and Power Commission and Shri H. P. Mathrani, I.S.E. (Retired), Development Advisor and Joint Secretary to the Government of India, Ministry of Transport and Communications, New Delhi.

Yours faithfully,

(Sd.) S. P. SARATHY,
Secretary.

APPENDIX 'A'

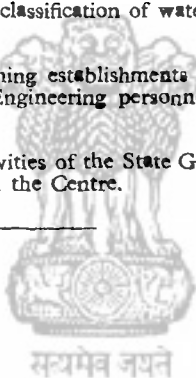
ANNEXURE I

Ministry of Transport

Directorate of Inland Water Transport

OBJECTS :—

1. To study the transport requirements of the country with a view to co-ordinate inland water transport with other modes of transport for (a) immediate requirements and (b) long term planning.
2. To set up a technical organisation for promoting inland water transport in conjunction with the Central Water & Power Commission (Directorate of Inland Waterways). The proposal will require careful study in a large scale relief model to be set up.
3. To study modern development in all its aspects such as improved design of craft, navigational aids, terminal facilities and conservancy with regard to inland water transport. Necessary research should also be carried out.
4. To draw up standards for classification of waterways, size of locks and clearance under bridges etc.
5. Setting up of suitable training establishments such as (a) Training of diesel mechanics (b) Deck and Engineering personnel, (c) Conservancy and traffic staff.
6. Co-ordinate and guide activities of the State Governments and amalgamating the existing organisation in the Centre.



APPENDIX 'A'
ANNEXURE II

Director

Deputy Director (Civil Eng.)	Deputy Director (Naval Architecture- <i>oam</i> -marine)	Deputy Director (Navigation)	Deputy Director (Traffic)
2. Asstt. Directors.	2. Senior Draftsmen.	(1 for Hydrographical Survey & 1 for navigation).	Asstt. Director Statistics.
1. Sr. Draftsman.	1. Tracer.	2. Survey Assistants.	Asstt. Statisticians.
1. Jr. Draftsman.	N.B. (It may also be necessary to have a high level part time Adviser for a year or so).	2. Tracers.	6. Traffic Inspectors.
2. Tracers.			

APPENDIX 'A'
ANNEXURE III

Statement showing the Annual estimated Expenditure on Establishment for the Directorate of Inland Water Transport

Serial No.	Name of Post	Scale	No. of posts	Average monthly pay	Monthly Allowances	Total monthly Expenditure	Total annual Expenditure
		Rs.		Rs.	Rs.	Rs.	Rs.
1	Director	1300-60-1600-100-1800	1	1540	Nil	1540	18,480
2	Deputy Director	600-40-1000-1000-1050-1050-1100-1100-1150.	4	850 x 4 = 3400	165 x 4 = 660	4060	48,720
3	Asstt. Director	350-350-380-380-30-590-EB-30-700-40-850.	5	600 x 5 = 3000	130 x 5 = 650	3650	43,800
4	Asstt. Statisticians	350-350-380-380-30-590-EB-30-770-40-850.	6	600 x 6 = 3600	150 x 6 = 900	4500	54,000
5	Traffic Inspectors	260-350	6	300 x 6 = 1800	105 x 6 = 630	2430	29,160
6	Survey Inspectors	160-10-330	2	250 x 2 = 500	100 x 2 = 200	700	8,400
7	Senior Draftsman	150-7-185-EB-8-225.	3	185 x 3 = 555	90 x 3 = 270	825	9,900
8	Junior Draftsman	100-5-125-6-125-EB-6-185	1	145	80	225	2,700
9	Tracers	60-4-120-EB-5-150.	5	100 x 5 = 500	70 x 5 = 350	850	10,200
					TOTAL		225,360

APPENDIX 'A'
ANNEXURE IV

Statement showing the Annual estimated Expenditure on Establishment (non-technical) for the Directorate of Inland Water Transport

Serial No.	Name of Post	Scale	No. of Posts	Average monthly pay	Monthly Allowance	Total monthly expenditure	Total annual expenditure
		Rs.		Rs.	Rs.	Rs.	Rs.
1	Section Officer	275-25-300-25-500	2	$400 \times 2 = 800$	$100 \times 2 = 220$	1,000	12,000
2	Upper Division Clerks	80-5-120-EB-8-200-10/2-220	4	$150 \times 4 = 600$	$85 \times 4 = 340$	940	11,280
3	Lower Division Clerks	60-3-81-4-125-5-130	4	$100 \times 4 = 400$	$70 \times 4 = 280$	680	8,160
4	Stenographer	160-10-330	1	250	95	345	4,140
5	Stenotypists	60-3-81-4-125-5-130 plus Spl. Pay. 20/-	4	$100 \times 4 = 400$	$70 \times 4 = 280$	680	8,160
6	Daftary	35-1-50	2	$40 \times 2 = 80$	$55 \times 2 = 110$	190	2,280
7	Peons	30-1-35	12	$31 \times 12 = 372$	$55 \times 12 = 660$	1,032	12,380
					Total		58,400

APPENDIX 'A'
ANNEXURE V

Statement showing the annual estimated expenditure on the I. W. T. Section in substitution of the existing I. W. T. Section in the Ministry

Serial No.	Name of Post	Scale	No. of Posts	Average monthly pay	Monthly Allowances	Total expenditure	Total annual expenditure
		Rs.		Rs.	Rs.	Rs.	Rs.
1	Section Officer	530-30-710-EB-30-800.	1	650	130	780	9,360
2	Assistants	160-10-300-EB-15-450.	3	300 × 3 = 900	100 × 3 = 300	1,200	14,400
3	Upper Division Clerks	80-5-120-8-200-10/2-220.	4	150 × 4 = 600	85 × 4 = 340	940	11,280
4	Lower Division Clerks	60-3-81-4-125-5-130.	3	100 × 3 = 300	70 × 3 = 210	510	6,120
5	Daftary	35-1-50.	1	40	55	95	1,401
6	Peon	30-1-35.	1	31	55	86	1,032
TOTAL						.	43,300

APPENDIX "A"
ANNEXURE VI
Summary of Estimate

Cost of technical staff	Rs. 2,25,360	Annexure III
Cost of non-technical office staff in the Directorate	58,400	Annexure IV
Cost of Office staff in the Ministry (I.W.T Section) into which the present organisation will merge	45,200	Annexure V
Probable expenditure in connection with a part-time Adviser at Rs. 1,000 per mensem	12,000	
Probable expenditure of T.A. and contingencies includ- ing equipment	28,300	
TOTAL	<hr/> 3,67,390	
Sav	<hr/> 3,67,400	



APPENDIX "B"

ANNEXURE 1

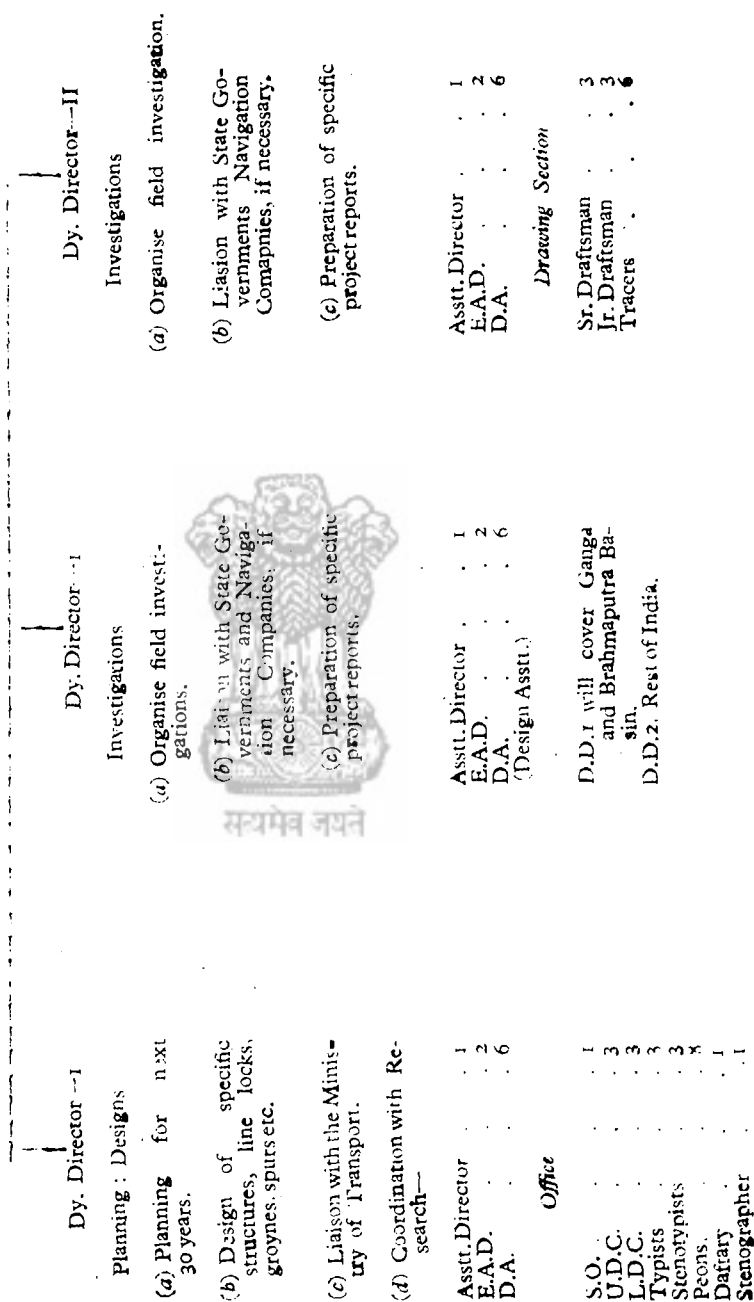
Central Water and Power Commission Directorate of Inland Waterways

OBJECTS :--

1. To study the existing waterways in India and formulate schemes for their improvements.
2. To prepare technical reports on designs of waterways and connected structures.
3. To formulate proposals for extension of navigability of inland waterways for immediate and short term implementation, having regard to availability of water under irrigation, power and Multi-purpose projects. Any special project to be undertaken purely for navigation must also be considered. (N. B. Short term means a period of 30 years).
4. To investigate and prepare project report, designs and estimates after carrying out necessary structural and hydraulic model tests for the above after due consultations and in co-ordination with State Chief Engineers concerned and Directorate of Inland Water Transport to be set up under the Ministry of Transport.



APPENDIX "B"
ANNEXURE II
Proposed Directorate of Inland Waterways Organisational and Functional Chart



APPENDIX "B"
ANNEXURE III

Statement showing the Annual Estimated Expenditure on Establishment for Directorate of Inland Waterways

Serial No.	Name of Post	Scale	No. of posts required	Expenditure for 12 months	Total expenditure
1	Director	Rs. 1300-60-1600-100-1800 with S-G Rs. 1800-IV-200.	1	Pay— Rs. 1420 × 12 = 17040 Allowances— Rs. TOTAL	17,040
2	Dy. Director.	Rs. 600-40-1000-1000-1050-1050-1100-1100-1150.	3	Pay— Rs. 680 × 3 × 12 = 24,480 Allowances— Rs. 125 × 3 × 12 = 4,500 TOTAL	28,980
	Assistant Directors	Rs. 350-350- 80-380-30 590-EB-30-770-40-850.	3	Pay— Rs. 380 × 3 × 12 = 13,680 Allowances— Rs. 100 × 3 × 12 = 3,600 TOTAL	17,280
					63,300
	Extra Assistant Directors	Rs. 275-25-500-EB-30-650-EB-50-800.	6	Pay— Rs. 326 × 6 × 12 = 23,400 Allowances— Rs. 100 × 6 × 12 = 7,200 TOTAL	30,600
				Carried Over	93,900

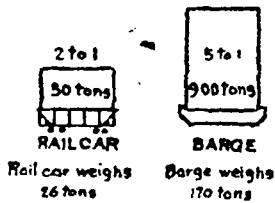
				Brought forward	Rs.	93,900
5	Design and Engineering Asstt.	160-10-330.	18	Pay— Rs. 180 × 18 × 12 Allowances— Rs. 85 × 18 × 12	38,880 18,360	
					57,240	57,240
6	Sr. Draftsman	Rs. 150-7-185-EB-8-225.	3	Pay— Rs. 164 × 3 × 12 Allowances— Rs. 85 × 3 × 12	5,904 3,060	
					8,964	8,964
7	Jr. Draftsman	Rs. 100-5-125-6-155-EB-6-185.	3	Pay— Rs. 110 × 3 × 12 Allowances— Rs. 77 × 3 × 12	3,960 2,772	
					6,732	6,732
8	Tracers	Rs. 60-4-120-EB-5-150.	6	Pay— Rs. 68 × 6 × 12 Allowances— Rs. 65 × 6 × 12	4,896 4,680	
						9,576
9	Section Officer Grade III	Rs. 275.	1	Pay— Rs. 725 × 12 Allowances— Rs. 100 × 12	3,900 1,200	
						5,100
10	Upper Division Clerks	Rs. 80-5-120-EB-8-200-10-2-220.	3	Pay— Rs. 95 × 3 × 12 Allowances— Rs. 72 × 3 × 12	3,420 2,592	
						6,012

Serial No.	Name of Pos.	Scale	No. of posts required	Expenditure for 12 months	Total expenditure
11	Lower Division Clerks	Rs. 60-3-81-EB-4-125-5-130.	3	Pay— Rs. 66 × 3 × 12 Allowances— Rs. 75 × 3 × 12	Rs. 2,376 2,340
12	Stenographer	Rs. 160-10-330	1	Pay— Rs. 180 × 12 Allowances— Rs. 85 × 12	Rs. 2,160 1,020
13	Stenotypist	Rs. 60-3-81-EB-4-125-5-130. Special Pay—Rs. 20.	3	Pay— Rs. 72 × 3 × 12 Allowances— Rs. 72 × 3 × 12	Rs. 3,096 2,592
14	Typists	Rs. 60-3-81-EB-4-125-5-130.	3	Pay— Rs. 66 × 3 × 12 Allowances— Rs. 65 × 3 × 12	Rs. 2,376 2,340
15	Daftary	Rs. 35-1-50.		Pay— Rs. 37 × 12 Allowances—	Rs. 4,716 444 600
				1,044	1,044

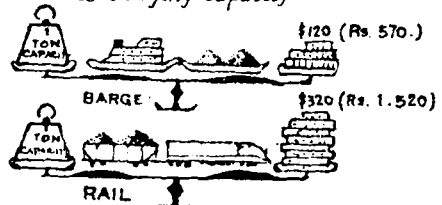
APPENDIX - III.

COMPARATIVE EFFICIENCY BARGE vs. RAIL Transportation

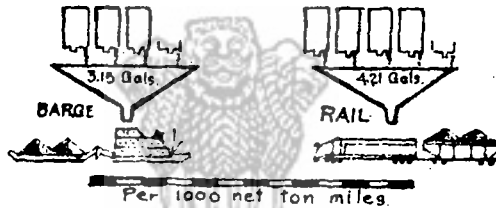
Ratio of Equipment WEIGHT
to carrying capacity



Ratio of Equipment COST
to carrying capacity

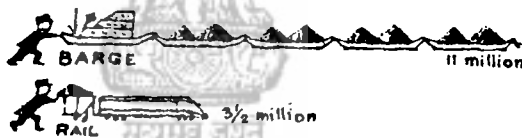


Diesel Fuel
Consumption



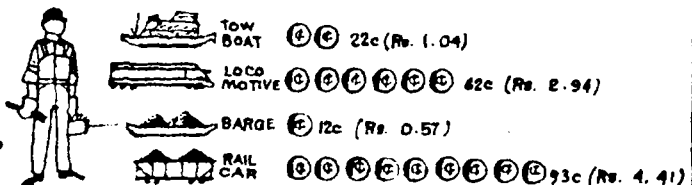
Labor
Productivity

Ton miles per
operating employee



Maintenance
and
Repair Costs

average cost per 1000
net ton miles



(One of the charts exhibited by Inland waterways common
carriers association U.S.A.

Reproduced from *THE WORK BOAT* APRIL 1958.)

(Vide para 10.2 Chapter III.)

APPENDIX IV

(Vide paragraph 35—Chapter X)

LIST OF SCHEMES RECOMMENDED FOR INVESTIGATION

N. B. :— (1) This list is not comprehensive.

(2) The estimated costs are very approximate.

(3) The estimates do not include any provision for recurring expenditure.

(4) This list does not include any provision for assistance to the I.W.T. operators, nor for purchase of craft whether in the public or private sectors.

ASSAM

	Rs. (in lacs)
1. Detailed hydrographic surveys	10
2. Periodic aerial surveys of key-shoals on the Brahmaputra	10
3. Terminal facilities	300
4. Approach roads to river ghats	50
5. Ship repair facilities	30
6. Dredgers	100
7. Ferries (four)	80
8. River training	200
9. Country boat co-operatives	50
10. Navigational aids	50
11. Radio Communications	10
12. Customs and Security facilities at border stations	20
13. Pilot Project on feeder rivers	60
TOTAL	970

WEST BENGAL

1. Hydrographic Survey of Sunderbans	10
2. Dredgers	100
3. Customs and Security facilities at border stations (Behari Khal)	20
4. Conservancy and navigational aids on the Sunderbans area	10
5. Ferry for North Bengal	20
6. Improvement of Terminal facilities at Calcutta	100
7. Improvements to Chitpur lock and provision of boat basin etc.	30
8. Country-boat co-operatives	50
9. Navigational aids on the river Hooghly between D. V. C. Canal and Calcutta Port	10
10. Investigations for possible extension of the D.V.C. Canal upto Sindri	10
11. Improvements to the Hijli Canal	10
12. Development of Inland Water Transport on D.V.C. Canal	100
13. Pilot Project for Sunderbans	30
TOTAL	500

BIHAR

	Rs. (In lacs)
1. Navigational aids	10
2. Dredgers	30
3. Development of country-boat co-operatives	50
4. Approach road to ghats	10
5. Terminal facilities	20
6. Ferry Services	40
7. Ship repair facilities	30
8. River training	50
TOTAL	240

UTTAR PRADESH

1. Approach roads to ghats	40
2. River training (Ganga Ghagra and Tapti)	45
3. Terminal facilities	20
4. Hydrographic surveys	5
5. Repair facilities	50
6. Country-boat co-operatives	30

ORISSA

1. Improvement to the Mahanadi from Dholpur to Cuttack	50
2. Major improvements to High Level Canal I, Taldanda and Kendara Canal	200
3. Dredgers for maintaining depths on Canals, estuaries and on the Mahanadi	60
4. Development of country-boat co-operatives	50
5. Terminal facilities at Jenapur and Paradip	40
6. Ferries in the estuaries of the Mahanadi, Dhamra and Devi rivers	50
TOTAL	450

MADRAS

1. Dredgers for Buckingham and Vedaranyam Canals and river crossings	40
2. Terminal facilities at Madras Wharves on the Buckingham Canal	10
3. Road-connections, tow paths and fresh water supply etc.	30
4. Country-boat co-operatives	30
TOTAL	110

ANDHRA PRADESH

	Rs. (In lacs)
1. Dredgers for maintaining depths in the Buckingham Canal and river crossings.	60
2. Road connections to important towns and terminal facilities, tow-paths along the canal bank and fresh water supply.	40
3. Dredgers for Delta Canals.	40
4. Provision of two locks on the Pulleru and Masulipatnam Canals.	20
5. Improvements to the Krishna, Godavari and Tributaries.	200
6. Boat repair facilities.	20
7. Country-boat co-operatives.	40
8. Ferries—Krishna—Godavari Deltas.	60
TOTAL	480

KERALA

1. Construction of toe walls	20
2. Improvements to West Coast Canal, North of Cochin including new locks, bridges with adequate head-room etc.	200
3. Improvements to Stretch between Cochin and Quilon including provision of navigational facilities and terminal facilities at Alleppey and Quilon wharves.	100
4. Improvements to Beypore river, Pamba and other rivers and backwaters	40
5. Improvements to other canals of the State	20
6. Dredgers (6 Nos.)	80
7. Country-boat co-operatives	50
8. Alleppey Shartalai Canal	40
9. Extension of West Coast Canal Badagara to Mahe.	40
10. Ferries.	50
TOTAL	640

MYSORE

1. Coastal Canal between Mangalore and Coondapur	70
2. Country boat co-operatives.	20
3. Ferries.	20
TOTAL	110

BOMBAY

1. Hydrographic Surveys.	50
2. Dredgers.	100
3. Navigational aids.	40
4. Country-boat co-operatives.	50
5. Terminal facilities at Karambhavane on Vasishti River.	20
6. Approach roads to ghats and road approaches.	10
7. Tugs on the Narbada and Tapti rivers.	20
8. Inland Water Developments in Bombay and Salsette Islands.	900
9. Ferries.	30
TOTAL	1220

MADHYA PRADESH

1. Improvements of ferries and country-boat co-operatives.	Rs. (In lacs)
	50

PUNJAB

1. Improvements of Ferries and country-boat co-operatives.	50
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KASHMIR

1. Improvements of waterways and development of I.W.T.	50
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RAJASTHAN CANAL

1. Provision of works required for future navigability and head-room under bridges of the canal.	500
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(a) Total estimated requirement

	(Crores)		(Crores)
Assam	9.70	Ganga Barrage Project	10.00
West Bengal	5.00	Provision of nagivation facilities	
Bihar	2.40	in river valley projects	100.00
Uttar Pradesh	1.90		
Orissa	4.50	Central Organisation	1.00
Madras	1.10		
Andhra Pradesh	4.80	Training Establishment	1.00
Kerala	6.40		
Mysore	1.10		112.00
Bombay	12.20		55.60
Madhya Pradesh50		
Punjab50	GRAND TOTAL	167.60
Kashmir50		
Rajasthan Canal	5.00		
	55.60		

APPENDIX V

(Vide para. 37.1, Chapter XI)

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

S. No.	Reference to Para No.	Summary of Conclusions/Recommendations
1	2	3
1.	8	In the past the river valleys were cradles of civilisation and waterways were the main means of communications.
2.	7 & 9	The history of decline of inland water transport is not peculiar to India alone.
3.	7 & 9	Inland water transport has now developed into a flourishing and vital mode of transport in Europe and America because of adequate measures for improvement of waterways adopted by the Governments of those countries and location of industries in close proximity thereto
4.	10.1	Inland water transport has an important role to play. It can supplement other modes of transport and is particularly suited for commodities in bulk.
5.	10.2	The capital and maintenance cost compare very favourably with other modes of transport and it is possible to move a greater quantity of traffic between any two points within a specified time than by any other mode of transport provided the waterways are in good condition.
6.	12.2 & 12.5	93% of Assam's tea and 90% of her jute are transported by waterways. Assam is dependent on water transport to a large extent.
7.	12.17	Aerial and hydrographic surveys of the main shoals of the Brahmaputra should be carried out.
8.	12.18	The conservancy of waterways must no longer be the responsibility of any private operators but should be carried out by Government.
9.	12.19	Draft restrictions, taking into consideration available depth over shoals should be enforced on the Brahmaputra to obviate any disruption of water borne traffic.
10.	12.20	Terminal facilities in Assam are inadequate. Construction of an inland Port at Pandu should be proceeded with. Terminal facilities at Dhubri on the Brahmaputra, and on the Kushiya should be taken in hand in the next Plan. The foreshore at Gauhati should be raised and pitched and parking space for lorries should be provided. At Neamati and a number of Ghats light portable prefabricated aluminium transit sheds should be provided.
11.	12.21	Afforestation measures in the catchment areas of the rivers of the Brahmaputra and Surma Valleys are essential.
12.	12.22	Ship repair and docking facilities are necessary in Assam.
13.	12.24	Hydrographic surveys of feeder rivers in Assam should be undertaken for developing feeder services.

1	2	3
14.	12.25	Construction of a lock for craft from Longayi river to enter Kushiara river through Natiyal Khal should be investigated.
15.	12.26	Liaison with I.W.T. Authority in East Pakistan should be established.
16.	13.1	Early implementation of the Ganga Barrage Project is essential.
17.	13.9	Hydrographic surveys of Sunderbans between Channel creek and Thakuran river should be carried out for planning dredging operations to improve the steamer route.
18.	13.11	The Damodar Valley Corporation Canal should be made toll free for a specific period to attract boating interests. This canal serves a highly industrial area where a transport bottleneck exists. Steps should, therefore, be taken to develop water transport on this canal.
19.	13.12	The Hijli Tidal Canal should be better maintained in view of lack of other communications.
20.	13.13 & 12.15	A suitable launch should be acquired for Customs and Police use at Beharikhal in Sunderbans to obviate undue detentions to I.W.T. craft. Similar facilities are necessary at Dhurbi on the Brahmaputra.
21.	13.14 & 13.15	Improvements of terminal facilities on the Hooghly, provision of a non-tidal berth in the Docks and release of No. 3 berth in the King George Dock for tea traffic, are essential in the Port of Calcutta. Possibility of development of a boat basin in Chitpur Canal, improvement of canal lock and lift bridge should be investigated.
22.	14.14	There has been considerable decline in the activities of country boats on the Ganga due to altered trade conditions following partition and the levy of ghat charges by ferry contractors.
23.	14.16 & 14.17	The responsibility for maintaining transport services on the Ganga and Ghagra lies with the State Governments. A country boat service with tugs to provide the haulage should be started so as to run rail-cum-river services between Calcutta and Upper India via Sakrigali Ghat or Rajmahal. Governments should divert adequate traffic for this service.
24.	14.19	Industrialists should be encouraged to locate industries on the banks of the Ganga in suitable areas. Conservancy and river training measures should aim at improving the navigability of the Ganga and the Ghagra.
25.	15	In the deltaic region of Orissa, inland water transport is the most important mode of transport. It is necessary to plan co-ordinated development of these waterways. The development of the Port of Paradip should also be planned simultaneously.
26.	15.9 15.13 & 15.14	The High Level Canal Range I and the Kendrapara and the Taldanda Canals should be improved, and the Taldanda canal should be extended to Paradip Port. New locks should be constructed on the canals as the traffic develops on the bridges should have a head clearance of 16 ft. above High water level. Lining of the sides of the canal from 3 ft. above water level to 3 ft. below water level is necessary for powered craft to operate. The Mahanadi river from Dholepur to Cuttack should be improved on the basis of hydrographic surveys. There are excellent opportunities for location of industries in this area with adequate raw materials and power from Hirakud available.
27.	15.12	The tolls at present charged over Orissa canals are excessive and should be reduced.
28.	16.2 & 16.11	The Buckingham Canal suffers from limitations such as inadequate maintenance, lack of head room under the two Railway bridges

1	2	3
		<p>in the Madras city area, lack of terminal facilities, inadequate road connection with important rail heads and towns, absence of regular tow-paths and difficulties in obtaining fresh water supplies. The cargo transported by this canal does not form part of the trade passing through the Port of Madras. It is not practicable to connect the canal to the Port. The Canal should, however, be maintained for existing craft to operate fully loaded (3 ft. draft) and facilities including warehouses with compound walls at important wharves, to avoid detentions to craft, should be provided.</p>
29	16.12 & 16.14	<p>The Vedaranyam Canal should be maintained for existing traffic. Beyond that there is no justification for major improvements or extension of this canal.</p>
30	17 to 17.13	<p>The Delta Canals of the Krishna and Godavari rivers play an important role in transporting iron ore to the minor ports of Musliapatnam and Kakinada. With the completion of the Krishna Barrage, additional water will be available in Musliapatnam and Ellore Canals. The requirement of water transport should be given adequate weightage in planning additional irrigation facilities. Lining of these two canals for powered craft should be taken up as traffic develops. Suitable locks should be constructed on Pulleru Canal to meet transport requirements.</p>
31	17.16	<p>Improvement of navigability of the Krishna and Godavari rivers should be planned after detailed investigations to facilitate transport of lime kankar to cement factories in Vijayawada and iron ore to Kakinada.</p>
32	18.7 & 18.8	<p>In Kerala, there are a number of industries situated close to the waterways, which use this mode of transport. The most of important stretch of the West Coast Canal system is between Cochin and Quilon where the deepening and widening of the channel to a minimum bed-width of 50 ft., and a depth of 6 ft. at low water, improvement to terminal facilities, and navigational aids are necessary.</p>
33	18.8 & 18.10	<p>In the stretch north of Cochin, two locks should be constructed between Punani and Cherwayi to replace earth dams. New locks should be designed to replace the existing locks which are too small. Road bridges should have a minimum head room of 16 ft. This stretch of the canal should be maintained to a minimum bed width of 30 ft. except in rocky portion where the width may be reduced to 20 ft. The extension of the West Coast Canal, north of Badagara upto Mahe is recommended. The stretch between Trivandrum and Quilon is in a poor state and should be improved. Provision of two new tunnel to replace the existing ones at Verkalla can be considered if there is traffic potential.</p>
34	18.12	<p>The rigid restriction of licensing of tank boats with wooden hulls under Petroleum Rules is affecting the bulk transport of oil by Kerala waterways. As these rules were introduced on the analogy of Rules prevailing in the Port of London, we suggest consideration of the possibility of amending these Rules to suit local conditions.</p>
35	19	<p>The coastal strip of Mysore State, north of Mangalore, is devoid of through lines of communications. A canal linking Mangalore and Coondapur connecting numerous backwaters is likely to prove a useful waterway. There are a number of factories in this region which are likely to use this canal for transport requirements.</p>

1	2	3
36	20 to 20.10	Along the coast of Bombay State, the Coastal and inland navigation are closely inter-connected. The following improvements to waterways of Bombay are necessary ; (a) hydrographic surveys of the rivers and the creeks ; (b) dredging to improve depths ; (c) navigational aids for marking shoals, rocks etc. ; (d) tugs to assist country boats in tidal stretches to improve their turn round ; (e) extensive afforestation measures on the foot hills in the catchment area ; (f) improvement of terminal facilities. The problems of siltation of Rewas Jetty in the Dharamtar Creek should be studied in the models at Poona Research Station.
37	21	With the likely increase in the population of Greater Bombay, the transport bottle-neck will become more acute in future. Development of water transport on the Thana, Bassein Creeks and the Ulhas river is necessary. Immediate investigations such as hydrographic surveys, extent of rock cutting necessary and possibilities of increasing head room under bridges should be undertaken on the basis of which plans could be prepared by experts for development of water transport.
38	22 to 22.4	The area commanded by the Rajasthan Canal is void of communications. The proposed Canal with a gentle slope is suitable for development of water transport. We suggest there should be co-ordinated planning of the transport requirements of this region. The works on the canal should be so designed as to readily facilitate development of water transport in this area.
39	24.1 to 24.8	The waterway development in all countries like the U.S.S.R. and the U.S.A., has been mostly multi-purpose in character. In India the navigation aspect has not been given due consideration and should be kept in view while planning the development of rivers valleys and finalising the design of individual projects. The Central Technical Organisation should examine the provision of facilities such as locks etc., on the multi-purpose projects now being undertaken. It is essential that trees and other obstacles should be removed from the beds of reservoirs before water is stored to enable water transport to be developed.
40	24.9	With regard to the provision of navigation on the proposed Nagarjunasagar Canal, the details available are not adequate for us to give a definite opinion. We suggest that full details such as traffic potential be examined by the Central Organisation.
41	24.12	Investigations are necessary to ascertain to what extent a number of rivers in the country are navigable from their mouth upwards into the hinterland. It is only on basis of this and other data like traffic surveys, that it would be possible to assess the cost and feasibility of extending navigation up these rivers and the possibility of connecting them.
42	24.12	The Central Organisation should classify the navigable rivers and canals of the country following the practice in western countries but keeping in mind our own peculiar conditions. It should be the ultimate aim to develop a unified net work of waterways which can accommodate the most economical type of vessels with maximum draft throughout the year. The following classification is suggested for rivers and canals respectively.

Rivers

Class	Navigable minimum depth at		Width of channel
	H.W. Season	L.W. Season	
I . . .	8 ft	6 ft	400 ft
II . . .	6 ft	4 ft	300 ft
III . . .	4 ft	3 ft	150 ft

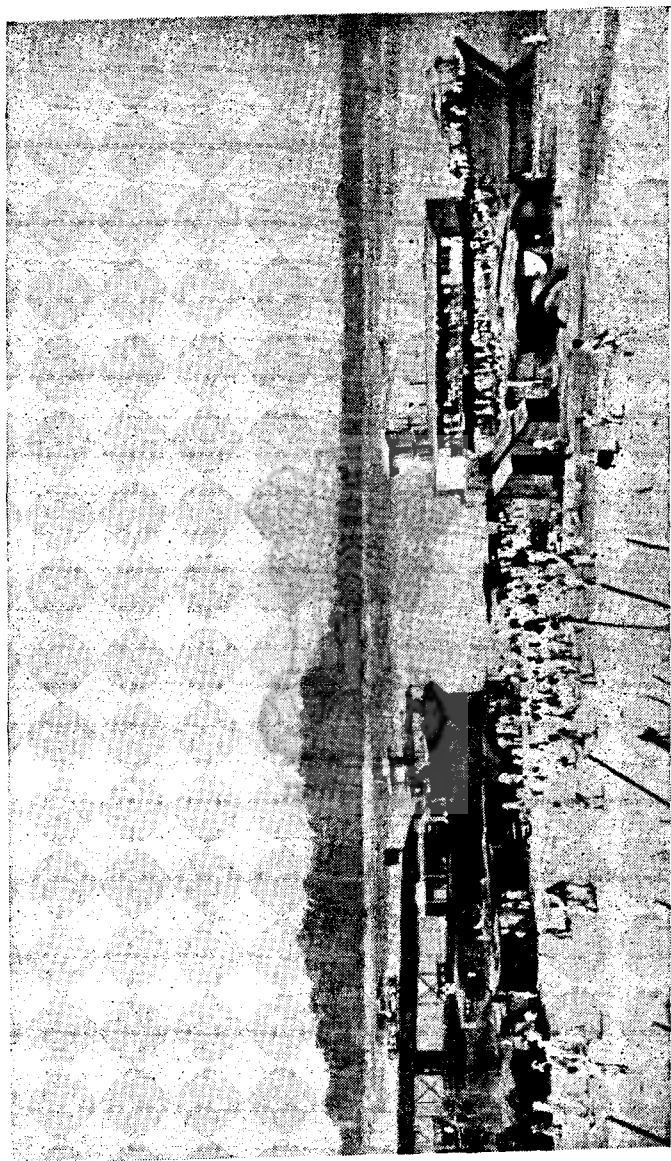
Canals

Class	Navigable depth	Minimum bed width
I	Over 6 ft.	50 ft.
II	6 ft. to 4 ft.	30 ft.
III	4 ft. to 3 ft.	20 ft.

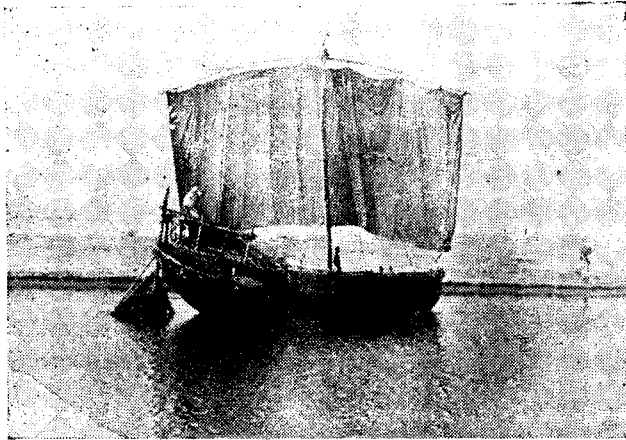
I	2	3
43. 25 to 25·8	.	The country craft play an important role in the transport system of the country. There has been a decline in the activities of country boats all over the country. The State Governments should organise them on co-operative basis and provide facilities, such as tugs, adequate cargo and ancillary occupations. Immediate steps should be taken to see that neither restriction of their operation by ferry contractors nor excessive tolls impede their operation. Mechanisation of country craft is not recommended.
44. 26·10	.	The employment potential of country craft and ferries is considerable. Expenditure on country boats would be fully justified even on this account.
45. 26 to 26·8	.	Operation of ferries in the country, with the exception of those operated by the Railways and organised inland water transport operators and one or two States, is inefficient and inadequate. Numerous country boat ferries have capsized with loss of life due to inadequate safety measures and over-crowding. People have a right to expect the Government to run ferry services on all important rivers until they are bridged and ferry services become unnecessary. The system of auctioning ferries is pernicious and must be given up. The North India Ferries Act and other similar Acts should be repealed. Ports like Calcutta, Cochin and Bombay should organise ferry and harbour excursion services and if necessary, existing laws should be amended for this purpose. Ferry services should also be organised on a number of multi-purpose reservoirs all over the country. They assist in making people water minded.
46. 26·9	.	We recommend that the Railway administration should run more ferry services wherever possible as a gesture of their interest in the development of inland water transport.
47. 27·1	.	Manufacture of craft, standard designs of propelling machinery and auxiliaries, including marine diesel engines should be encouraged in the country. Manufacture of dredgers in collaboration with foreign firms specialised in this field is necessary.

1	2	3
48. 28 . .		There is acute shortage of Indian Nationals to man I.W.T. craft especially among qualified personnel like Masters or Serang and Drivers. Existing training facilities are inadequate and should be improved. Engine room personnel be trained at existing workshops while Serangs, Dredging Masters and officers in charge of conservancy could be trained at marine organisations at various ports and by I.W.T. organisations. Facilities at the I.L.O. Centre at Rangoon where diesel mechanics are trained, should be better utilised.
49. 29.3 . .		The road and inland water transport advisory Committee, etc. up by the Government of India should be split up into two separate committees, one for roads and the other for inland water transport, both under the Chairmanship of the Minister of State for Transport & Communications.
50. 29.4 to 29.9 .		An inland water transport organisation in the Ministry of Transport & Communications should be created under an expert technical officer designated Director General of Inland Water Transport who should have the status of a Joint Secretary. The skeleton organisation now available in the Waterways, Irrigation and Navigation Directorate should be expanded and placed in charge of a Chief Engineer. The State Governments should also set up their own technical organisations to prepare schemes for development of waterways and maintenance of existing ones under the guidance of the Central Organisation. Thereafter it will be no longer necessary for regional boards like the Ganga Brahmaputra Water Transport Board to exist.
51. 29.9 . .		It is essential to employ technical men with experience of inland water transport at the Centre and State Government levels.
52. 30.1 to 30.3 .		Lack of an organisation to look after the waterways has led to virtual extinction of inland water transport at a number of places and is threatening the continued operation at others where it is still carrying on a precarious existence. It is only through setting up of a strong Central organisation that the Ministry of Transport and Communications will be able to implement the undertaking given to the Estimates Committee of Parliament to accept responsibility of co-ordinating and developing inland water transport in India.
53. 31.1 & 31.2 .		In the present neglected state of the waterways, development of water transport in certain areas, where conditions are favourable, should be taken up in the first instance before turning to other and more difficult areas.
54. 32.4 to 32.9 & 32.11 . .		There are possibilities of greater utilisation of inland water transport at Calcutta, Bombay, Cochin, Paradip and a number of minor ports. Details of schemes should be worked out. Utilisation of water transport for movement of ores to ports for export or to industrial centres for processing should be examined.
55. 33.3 . .		There does not appear to be sufficient justification for a direct service on the East Coast from Calcutta to Cape Comorin connecting the Orissa Coast Canal with the Buckingham and Vedaranyam Canals or to extend the East Coast Canal system to join the West Coast canals <i>via</i> Cape Comorin.
56. 33.4 . .		The question of linking various rivers can be examined after implementation of various multi-purpose projects during the next 30 years which will make the rivers navigable to a greater extent than at present.

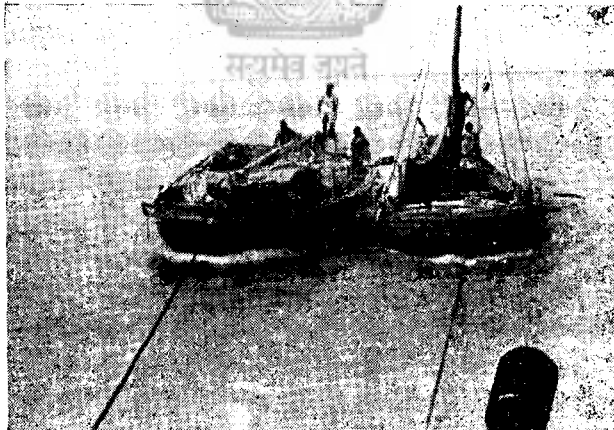
1	2	3
57. 33.5	.	Through-booking facilities with the Railways should be extended to established and organised inland water transport operators in all regions.
58. 33.6 & 33.7	.	Machinery on regional basis should be set up to make proper allocation of traffic from time to time bearing in mind the relative suitability of inland water and other modes of transport. In the present under-developed state of inland water transport, we do not envisage financial participation by the Railways.
59. 36	.	We do not recommend any of the waterways in India to be declared as a "National Waterway" at the present stage. We, however, strongly urge that the Government of India should assume responsibility for improving and maintaining all important waterways of the country specified by us in this report. The expenditure involved in maintaining and improving the waterways should be examined by the Central Technical Organisation on the basis of hydrographic surveys and other data.
60. 37.9	.	The provision of funds for development of water transport in the Second Five Year Plan is inadequate. A provision of at least Rs. 50 crores should be made in the Third Five Year Plan to ensure some appreciable advance. We do not recommend apportionment of this amount among different States but suggest that the money should be available for all properly worked up schemes from any State Government. The total expenditure for development of inland water transport envisaged in our report will be several times the figure of 50 crores but we recommend a provision of only Rs. 50 crores in the Third Five Year Plan because of the difficulty of usefully spending anything more than this amount.
61. 37.5	.	A concerted drive is necessary to make people water-minded. Government should encourage water sports, regattas, yacht clubs and organise boat races among a number of villages on similar lines to the traditional boat race in Kerala.
62. 37.6	.	A great deal of propaganda and publicity is necessary.



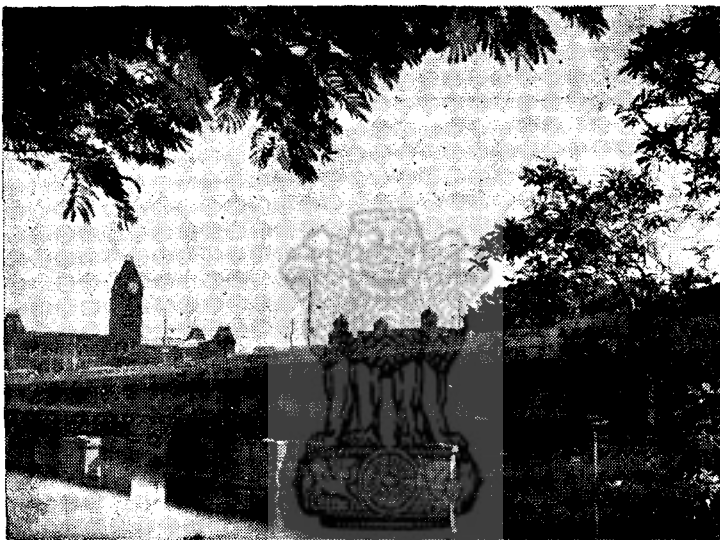
A Ferry at Fancy Bazaar Ghat, Gauhati.



A "Bhur" sailing down the Ganga

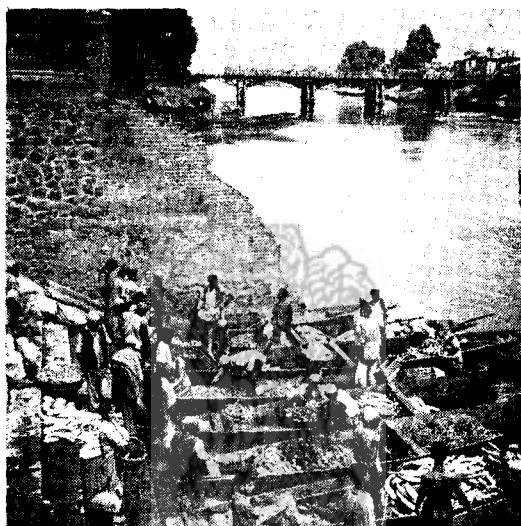


Two country boats abreast, being towed by a launch
on the Ganga

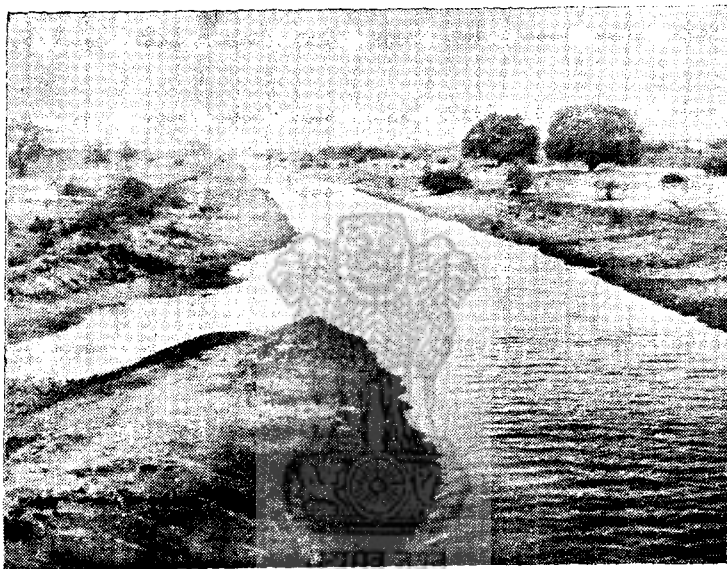


सत्यमेव जयते

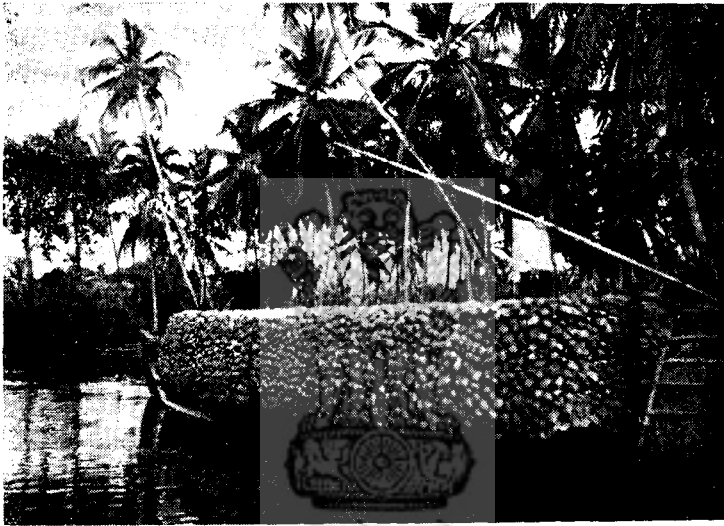
Park Station Railway Bridge with inadequate head-room over
the Buckingham Canal



Floating Vegetable market in Srinagar.



A stretch of Buckingham Canal showing lock of tow paths.



A "Vallam" loaded with Copra in the backwaters
of Kerala.



सत्यमेव जयते

Neglected state of a canal in Alleppey.

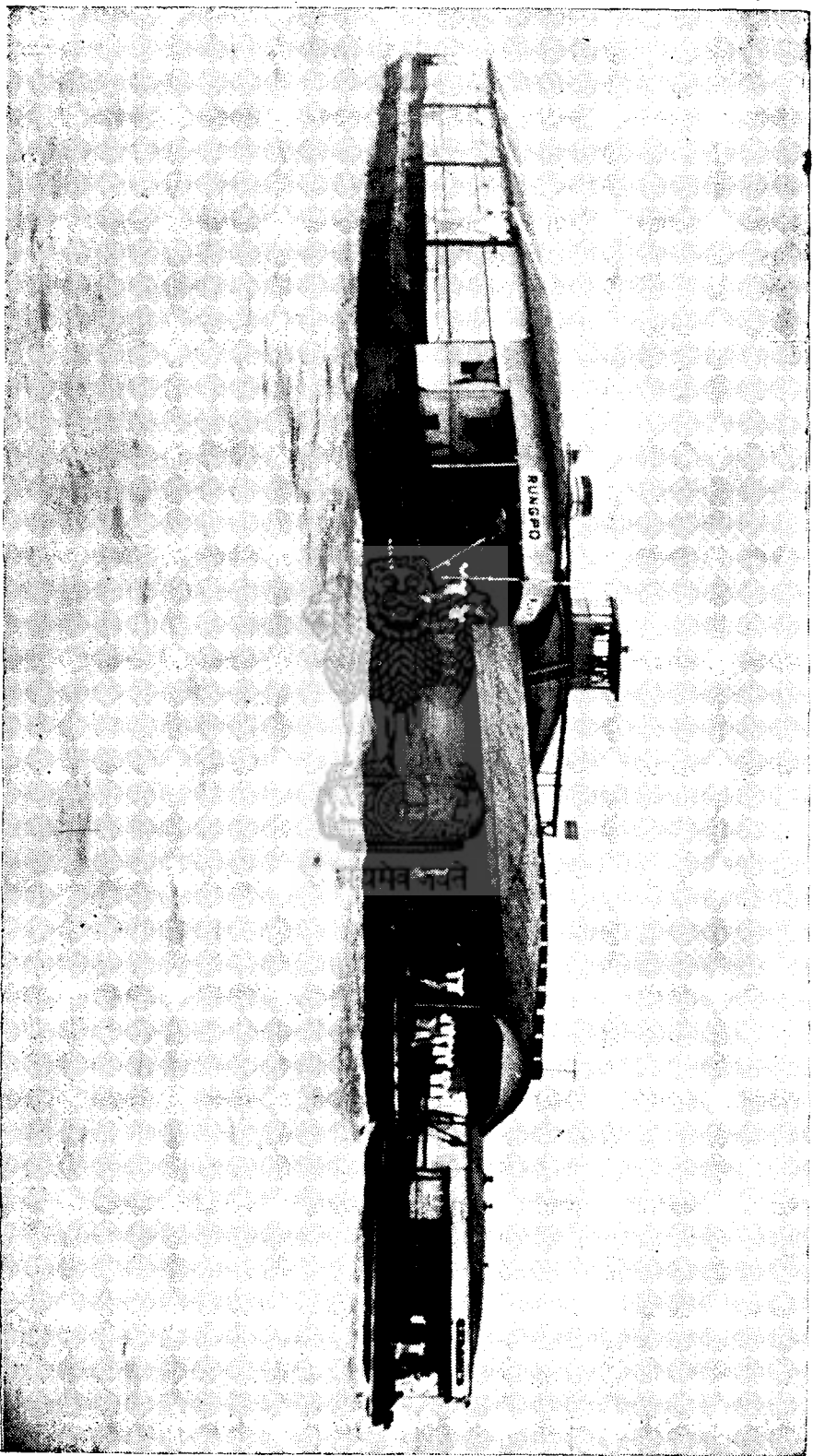


A sailing Craft on the West Coast

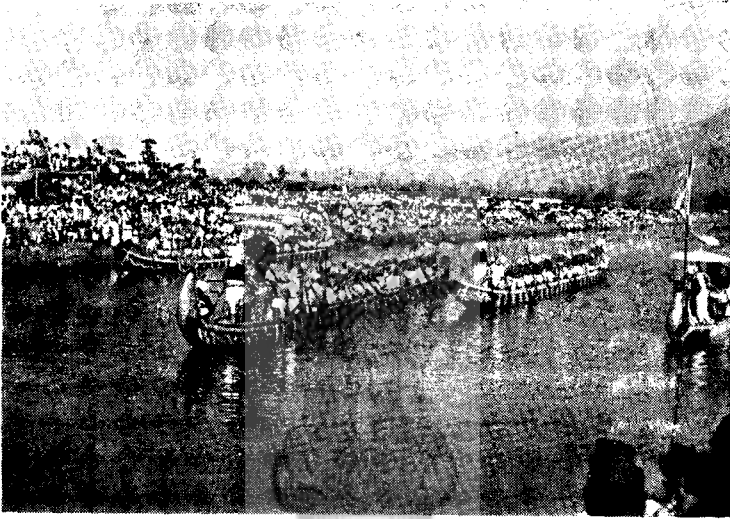


A boat Race in the backwaters in Kerala

सत्यमेव जयते



A paddle steamer towing two fars.



A boat Race in Imphal in 1953 when the Prime Minister
Graced the occasion.